INTERNATIONAL DATA PUBLICATION VOLUME 10, NUMBER 45 NOVEMBER 8, GROUP

HP's OpenView goals To keep up with its estimated user requirements, HP plans to increase the number of concurrent OpenView support.. 1996 1 million as well as the number of objects it can manage. 500,000 100,000 1994 1995 1996

HP paves distributed path for OpenView

Customers learn about new release of manager.

BY JIM DUFFY

Dallas Over the next 12 to 18 months, Hewlett-Packard Co.'s OpenView will evolve into a distributed, highly

scalable management system capable of storing and accessing management information anywhere on an enterprise

At last week's inaugural meeting of the OpenView Forum user group here, HP officials mapped out OpenView's metamorphosis from a centralized management platform dependent on a single database to a fully distributed system that melds data from multiple databases in a virtual repository. HP is revamping OpenView to make it easier to manage

works of corporate users and telecommunications

service providers.

The common

data store of

objects [offers]

cost saving. The

correlation of

data is the glue

to make it

Frank Belland, senior communications consultant, Martin Marietta Corp.

all work.

"The complexity of environments is going to continue to increase. We have to provide the foundation for millions of objects to be managed by hundreds of

> operators," said Bob Emerson, Open-View platform business manager.

> Users at the event were guardedly optimistic about the enterprise management strategy.

"They're doing a good job telling us where they're going with the data repository," said Tom Fader, senior specialist with E.I. du Pont de Nemours & Co. in Wilmington, Del. "We need it to do the things they say it will do."

OpenView's evolution will commence with the debut of OpenView 4.0

the increasingly large and complex distributed net- in the first half of 1994. Before the end of this year, See OpenView, page 66

technologies in McCaw net. Page 66.

Sun trials

new mgmt.

Novell users seek relief for aching E-mail backbones

BY CARYN GILLOOLY

Santa Clara, Calif.

88

104

125 148

215

When Novell, Inc. released Global MHS more than a year ago, the product was touted as the premiere electronic mail backbone, a billing it has had trouble

Global MHS eliminates name-space limitations in Novell's Message Handling System (MHS) 1.5 and, with its compression features, offers almost double the throughput. It is a NetWare Loadable Module (NLM), which obviates the need for a dedicated Email server and lets administrators leverage serverbased utilities such as remote management.

But according to users, Global MHS is still not ready for prime time. It faces problems ranging from limited backward compatibility with MHS 1.5 and total incompatibility with the directory service in Net-Ware 4.X to lack of third-party gateway support.

"I've had Global MHS for at least six months, maybe a year, and I still haven't installed it companywide," said Kenneth Orme, information systems spe-See E-mail, page 67

Counting up the contracts

Feb.

March

April May

June

Aug.

Sept

As of Nov. 4

IBM struggles with distributed database vision

BY PETER LISKER

Setting industry standards used to be IBM's forte, but its experience with the Distributed Relational Database Architecture (DRDA) shows just how much things have changed for Big Blue.

DRDA is IBM's plan for ensuring interoperability of its own relational databases as well as those from other database and tool suppliers. But years after its introduction, DRDA has met with little support and has been a source of confusion for customers and vendors alike. Vendors say they're not likely to invest in DRDA support until user demand develops - something that hasn't really happened thus far.

DRDA was supposed to help users make the move to client/server applications by providing them with a standardized method for accessing the massive volumes of information residing in IBM's mainframe DB2 database and other IBM systems, including SQL/DS on the Application System/400 and DB2 implementations on the OS/2 and RISC System/6000. See Vision, page 8

Firm finds salvation in Ethernet switching

Graphics firm redesigns overtaxed LANs.

BY SKIP MACASKILL

Wilsonville, Ore.

When your LANs are ready to burst at the seams and you're looking for relief, the list of options is enough to send even the most sanguine net manager screaming into the night.

While most emerging high-speed local-area network technologies -

Then

Mentor directly linked each Ethernet subnet to

one of 4 routers in the

data center. That resulted in heavy network

overhead and sluggish

such as Asynchronous Transfer Mode (ATM) and 100M bit/ sec Ethernet - promperformance gains, they can require major net upgrades and expense.

That's what Mento Graphics Corp. wanted to avoid when it overhauled its net recently.

The supplier of com-

puter-aided software engineering tools opted for Ethernet switching to boost net performance, as well as simplify configuration and administration. Its new switches reduce bottlenecks by providing dedicated Ethernet links to critical net resources.

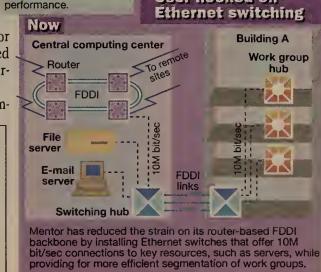
'[Ethernet switching] has allowed us to improve productivity, which

shortened development cycles," said Eric Thomsen, net engineer at Mentor. "The switching makes the net more manageable

User hooked on

SOURCE: MENTOR GRAPHICS CORP., WILSONVILLE, ORE

See Salvation, page 8



Customers snap up AT&T contract deals

The number of contract tariffs AT&T has filed with the FCC continues to grow at a steady clip.

BY BOB WALLACE

March

April

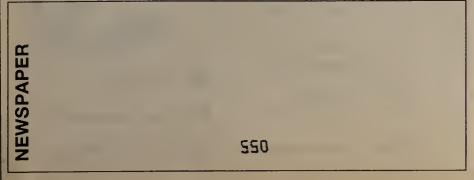
May

Critics have labeled them no-frills versions of Tariff 12 deals, but AT&T has filed more than 600 contract deals for hundreds of users in the roughly two years since the Federal Communications Commission approved the approach to marketing custom nets.

Contract tariff customers have been won over by the opportunity for significant discounts on regularly tariffed rates and the ability, in some cases, to lock in

But contract tariffs do not generally include benefits such as custom billing and special network management that made Tariff 12 deals popular with more than 100 users in the late 1980s and early 1990s. Further, unless negotiated otherwise, contract tariffs provide discounted - not fixed - rates that may change when tariffed rates fluctuate.

'AT&T's strategy here is to lock in business without giving up much more than discounts," said Hank See Contract, page 67



Briefs

AT&T to open up on ATM. AT&T this week will detail plans for its Asynchronous Transfer Mode (ATM) service, which will be generally available in the second half of 1994. AT&T also will make members of its ATM Advisory Council available to discuss their interest in AT&T's ATM offering. The carrier confirmed plans for the announcement but declined further comment.

A network manager at Halliburton Corp. expects AT&T to discuss features, such as T-1 access, that council members have asked the carrier to include in its ATM service. AT&T has already briefed Network World on its ATM strategy (NW, Oct. 11, page 13).

OSF delivers on DME. The Open Software Foundation, Inc. (OSF) last week announced general availability of its Distributed Management Environment (DME) 1.0 source code — DME Distributed Services. The technology was previously available only to OSF members. DME 1.0 includes management services for software distribution and licensing, personal computers, events and subsystems. A DME 1.0 source code license costs \$250,000, which allows full distribution rights for binary products. A limited distribution license, intended for internal use only, costs \$25,000.

OpenView meets AViiON. Data General Corp. last week said it will port Hewlett-Packard Co.'s OpenView net and systems management product to its Unix-based AViiON servers. OpenView on AViiON is expected to be available in the spring of 1994. Pricing will be announced at that time. DG also said it will integrate OpenView with OS/Eye*Node, a network, systems and application manager jointly developed by DG and Digital Access Corp. OS/Eye*Node will run as an Open View application on the AViiON hardware.

AT&T to share its expertise. AT&T last week announced a new business group called the Professional Services Division that will provide systems integration and outsourcing services to external companies. The new division is an offshoot of AT&T's Information Management Services Division, which is AT&T's internal information systems (IS) shop. AT&T decided to launch the new division as a commercial enterprise to capitalize on its staff's expertise in running the carrier's internal network computing systems. The move also builds on several systems integration projects taken on by AT&T's IS staff for outside firms, such as Delta Air Lines, Inc.

LAN Server to gain multimedia access. At the Comdex trade show next week, IBM's Personal Software Products division will roll out an add-on product for its LAN Server network operating system designed to give LAN Server clients access to multimedia applications (NW, July 26, page 7).

IBM: (800) 426-2468.

Simon ships. BellSouth Corp. last week rolled out Simon, a hand-held personal digital assistant designed and built by IBM. The 8-in.-long Simon combines the functions of a cellular phone, personal computer, wireless facsimile machine and pager. It supports electronic mail, calendar, address book and calculator features and a penbased notepad. It will be available next month for less than \$1,000.

Northern Telecom joins ANS. Northern Telecom, Inc. announced it has joined Advanced Network & Services, Inc. (ANS), the nonprofit corporation formed by IBM, MCI Communications Corp. and Merit, Inc., which provides T-3 backbone services for the Internet. Northern Telecom, which gave ANS a \$5 million grant to gain membership in the exclusive organization, said it will work with its ANS partners to develop broadband fiber switching and applica-

Contacts

ADDRESS: Network World, 161 Worcester Rd., Framingham, MA 01701. PHONE: (508) 875-6400; FAX: (508) 820-3467; INTERNET: network@world.std.com.; BBS: Interact with other readers: download free software, submit letters to the editor, leave news tips, change of address requests or hunt for jobs by using your IBM, Apple or other computer to dial into the BBS at 300 to 2,400 bit/sec (8N1) at (508) 620-1160 or at speeds up to 9.6K bit/sec by dialing (508) 620-1178. READER ADVOCACY FORCE (R.A.F.) HOTLINE: Contact us with story tips about pressing user issues, (800) 622-1108, Ext. 487; NETWORK HELP DESK: Contact Dana Thorat via any of the above means.

Network HELP desk

Network World tracks down answers to your questions regarding products, services, technologies or disputes with vendors. Please submit questions to Dana Thorat at (800) 622-1108, via fax at (508) 820-3467 or via the Internet at djt@world.std.com.

I need to extend our thin Ethernet network to another building. I have been told that I can use a pair of repeaters, one in the existing building and another in the new building, and 10Base-Twiringas long as the total distance does not exceed 606 feet. Is this possible? Is there a better way without burying a new cable?

Jim Ponder, Champaign, III.

Eric Brad, director of engineering services at International Micronet Systems, Inc., a San Francisco-based systems integrator, replies:

First things first. 10Base-T wiring cannot support Ethernet traffic for 606 feet. The maximum distance Ethernet traffic will travel over unshielded twisted pair is 100 meters, which is 328 feet, not 606 feet, regardless of which repeaters you use.

One possible solution would be to add a third repeater halfway between the two buildings to extend the distance. This would keep you within IEEE specifications, which allow five segments of Ethernet to be connected via repeaters.

The best solution, however, would be to use fiber-optic cable between the two buildings. Fiber is thin and could be fed through existing cable conduit, has a high tensile strength and can be pulled long distances without the risk of breaking. Fiber is also resistant to electrical and radio frequency interference, which may be a problem in outdoor cable runs.

Repeaters are available from many manufacturers that have thin or thick coaxial cable or unshielded twisted-pair ports on one side and fiber optic on the other. The distance limitation of Ethernet over fiber optic is 2km-or 1.25miles.

How can I tune our Internetwork Packet Exchange (IPX) servers to run efficiently over a wide-area network? The routers are IBM 661.1s connected via serial 56K bit/sec links.

> Claudio Lichtenthal, Boston See Help desk, page 53

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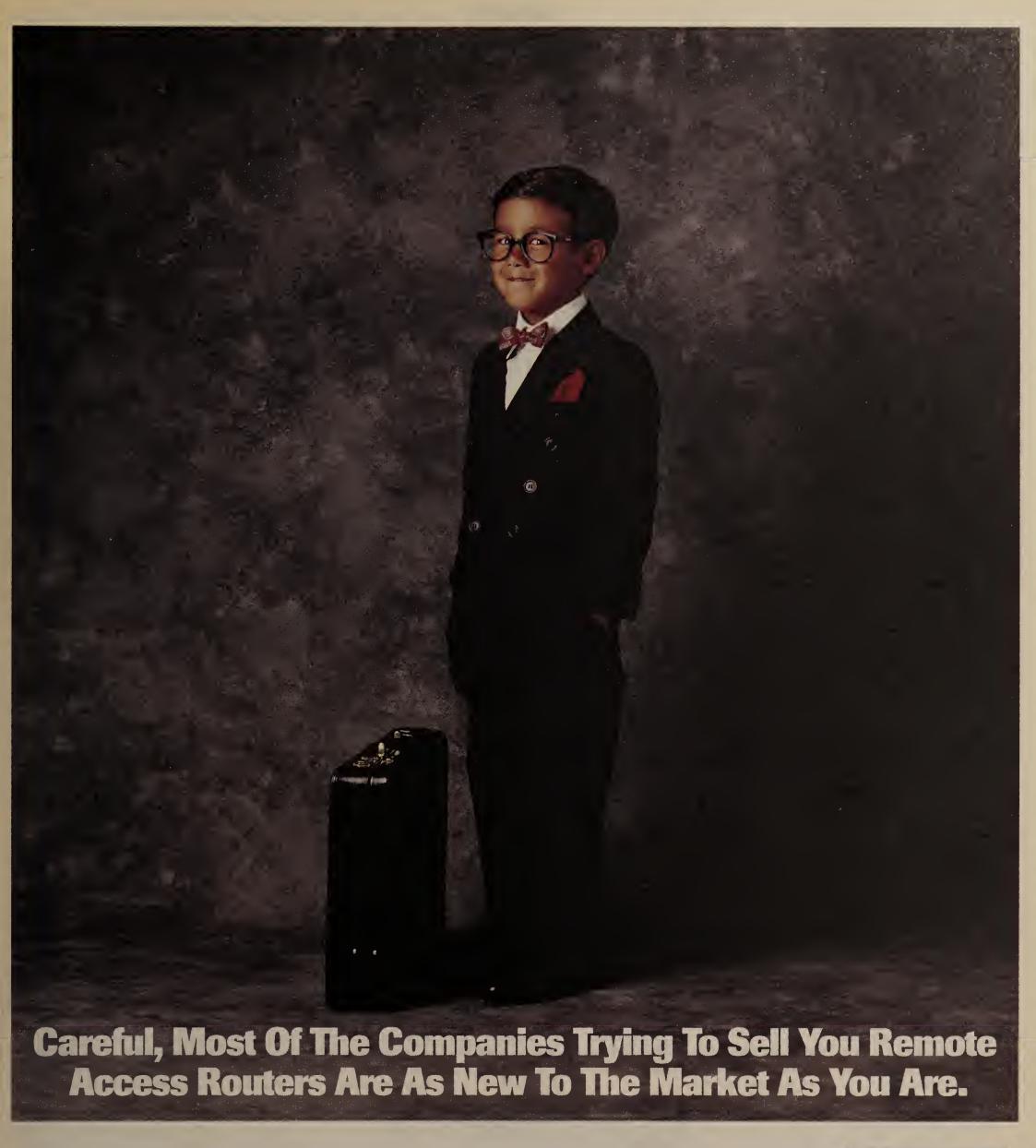
45 Buyer's Guide maps out what network mangers need to know when they look to cast T-1/T-3 multiplexers as their network anchors.



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Experience has taught us that a low price tag doesn't mean much if it comes at the expense of functionality and scalability. That's why Cisco guarantees access without compromise. Cisco's family of remote access products is designed to grow with your network and can be upgraded at any time. So we can meet your present and future needs. Just as importantly, Cisco lowers your total cost of ownership, with exclusive features like AutoInstall, for plug-and-play access. Dial-on-Demand routing. And CiscoWorks,™ which allows centralized router management of all your remote sites, even if you have thousands of them. Find out why Cisco continues to be the leader in the router market. Call us at 1-800-859-2726 for a flexible, scalable internetworking solution. After all, there's no substitute for experience. Access Without Compromise. C | S C | S Y S | E M S



IBM to announce expansion of parallel processing products

Will enable users to maintain initial hardware investments.

BY PETER LISKER

White Plains, N.Y.

IBM this week will announce a series of parallel processing enhancements to its RISC System/6000 and mainframe platforms designed to support a new class of transaction processing and decision support applications.

The new products will enable users to retain their investments in existing hardware while gaining the performance improvements and lower cost benefits of parallel processing. Parallel processing has often been mentioned by IBM, but the company's actual product support until now has been cursory.

IBM's new products in this area will include S/390-based parallel query and transaction servers based on multiple microprocessors, as well as an enhanced version of the RS/6000-based POWER Parallel server, according to a confidential memo obtained by Network World.

IBM officials declined to comment on the announcement.

IBM's support for parallel processing comes at a time when the leading database vendors, Oracle Corp, Informix Software, Inc., Ingres and Sybase, Inc., are evolv-

ing their software to support parallel query options.

Oracle, Sybase and possibly Informix are expected to participate in the announcement and make public their intentions to port existing and future versions of their products to the IBM plat-

"The net effect of [these platforms] will be to create a database application magnet that could make users move applications they have off-loaded from the mainframe back onto it," said Tom Nolle, president of the CIMI Corp. consultancy in Voorhees, N.J.

HOST OF NEW OPTIONS

IBM's new host-based query and transaction servers will be designed to work with the company's ES/9000 and ES/3090 main-

The S/390 parallel query server will run a customized version of IBM's DB2 database and process queries from decision support applications operating on OS/2 workstations running IBM's DB2/2 database.

IBM's S/390 parallel transaction servers will be configured for individual users and connect to ES/9000 511 and 711 model main-

These products have been designed to run on-line transaction processing applications, with iniimplementations running IBM's CICS/IMS applications. IBM also will likely showcase software that supervises the parallel transaction mechanism.

IBM also is expected to announce plans for a family of parallel processing, microprocessorbased host systems that will be available in the second half of the

The final component of IBM's processing strategy involves enhancements to its RS/6000 9076 SP1 POWER Parallel system, which was announced last February.

The server was initially targeted at technical computing environments, but IBM is moving the product into the commercial arena to support emerging database and other applications designed to run on parallel processing systems.

Further details were not avail-

Senior Editor Michael Cooney contributed to this article.

FCC throws Nynex a curve over popular service offering

BY MAUREEN MOLLOY

New York Telephone Co. is scrambling to appease users upset over an FCC ruling that forces the carrier to unbundle equipment from a popular service offering tailored to the financial community.

The Federal Communications Commission has rescinded a waiver it granted Nynex Corp. that allowed its New York Telephone unit to bundle

"You simply can't get the service the way you want it if you unbundle the equipment from the network because the two aren't separable."

multiplexing equipment with Enterprise Services, an offering that users lets quickly bring up and tear down DS0 connec-

tions. The service was intended to make it eas-

ier for companies in the financial services industry to establish DS0 links over which they could exchange data with one another.

In order to promote competition in equipment markets, the FCC normally forbids such equipment bundling, but Nynex convinced the commission that the Newbridge Networks, Inc. multiplexing equipment was crucial to the offering.

Largely in response to complaints by the Independent Data Communications Manufacturers Association, Inc., the FCC rescinded its waiver two weeks ago, saying the carrier must file a new tariff that would be an unbundled tariff arrangement.

That throws into question how the existing 130 customers will continue to get the service and may cause delays in providing the service to more than 100 users with pending contracts.

Nynex last week submitted a request to the U.S. Court of Appeals asking it to put the FCC order on hold, charging that a stay is necessary in order to enable the carrier to provide a smooth transition for its users from the existing service to the new so-called unbundled service.

Independent network equipment manufacturers contend that unbundling is necessary to keep competition healthy.

"By allowing the carrier to offer the equipment as part of a bundled service, the market for independent vendors gets preempted because in order to get the network service, the customer now has to buy the CPE from the carrier," said Albert Kramer, partner at Keck, Mahin & Cate in Washington, D.C. and counselor for the North American Telecommunications Association. "This is just a smaller version of predivestiture

Nynex has since filed the required

tariff but said it wants to make sure there is no gap in the service.

"Our main concern now is to ensure that there's a smooth migration from the existing version to the new version," said Frank Gumper, managing director of federal regulatory issues at Nynex. "The order could potentially result in a period of time when the current version is not available and, at the same time, the new version is not yet approved.'

WHO OWNS WHAT?

The Securities Industry Association, which represents more than 600 securities firms, said an unbundling requirement would adversely affect service quality and would give rise to myriad cost and management head-

Many users employ the mux supplied with Enterprise Services to support links to multiple trading partners. However, a user with 48 DS0s terminating at the mux may only be paying for half that many, with the other half being paid for by the company's various trading partners.

Today, New York Telephone keeps track of who pays for what circuits, but that task would be made far more difficult if the users owned and operated the

multiplexing equipment.

And if it were unbundled, the multiplexer would essentially be owned by multiple user companies, creating another logistical nightmare, said Hank Levine, a partner at Levine, Lagapa & Block, a Washington, D.C.-based law firm, and counsel for the Securities Industry Association.

"Bundling is needed to adequately

provide service. You simply can't get the service the way you want it if you unbundle the equipment from the network because the two aren't separable any-Lemore," vine said. "It LEVINE



having multiple users owning the equipment. Who will be responsible for calling the repairman when it

Gary Bacher, senior vice president of global communications for Prebon Yamane, Inc., a money and foreign exchange brokerage in New York and an Enterprise Services customer, said he was dismayed by the ruling.

"I understand the FCC's desire to provide uniform services and give competition a chance," Bacher said. "But the [CPE] vendors will be protected at the expense of the actual user because this could really be a monkey on the back of a lot of users."

BT to unveil portable videoconferencing system

BY ELLEN MESSMER

San Jose, Calif.

BT North America, Inc. this week will unveil a "carryout" style videoconferencing system that can be quickly transported from location to location.

The VC7000, weighing in at under 40 pounds, is a sleak integrated unit that contains a camera, standards-compliant video coder/decoder, audio system and keypad. With its 9-in. screen, it looks like a small television, but the built-in handset lets it work like a phone as well as a videoconferencing system.

HOW IT WORKS

The VC7000 uses switched 56K bit/sec digital services or Integrated Services Digital Network to set up videoconferencing calls.

It complies with the international H.320 set of videoconferencing standards approved by the Telecommunication Standardization Sector (TSS) (formerly called CCITT), enabling it to work with other similarly compliant systems from other vendors.

The VC7000 comes with dialup communications software that includes a number-storage directory and has on-screen menus that guide users through videoconferencing call setup or preprogrammed dialing processes.

Don Heath, vice president of product management and marketing at BT North America, said the new unit was developed to "satisfy customers' desire for impulse videoconferencing."

EASE OF USE

Traditional room systems, and

even the more mobile roll-about systems, are far too heavy for an individual to pick up and pack in the car. But VC7000 offers "videoto-go," and fills in the gap between room systems and personal computer-based videoconferencing systems, which essentially consist of add-on equipment to PCs.

The VC7000 trans-

mits video images at up to 30 frame/sec, comparable to larger systems from various vendors.

Additional interface ports allow plug-in of an auxiliary camera, slide-to-video converter, PC, document camera and an auxiliary monitor. The system also supports PC-to-PC file transfers at up to 19.2K bit/sec over the video link.

The VC7000, available in North America this December, will cost \$11,950.

©BT North America: (800) 872-7654; in Canada: (800) 874-

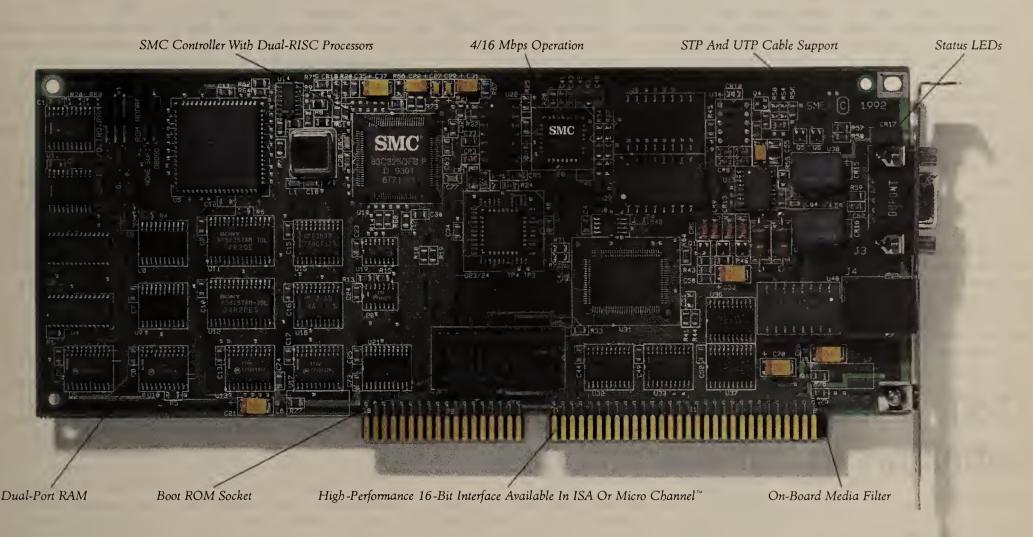
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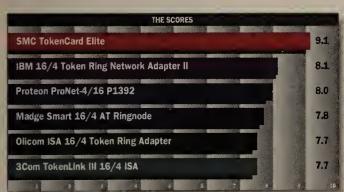
Compatible. Reliable. And at \$249, incredible.



There's a new leader in Token-Ring Technology.

In June 1993, InfoWorld tested the top Token-Ring adapters for speed and flexibility. Guess who came out on top?

Not IBM, Madge or Olicom. But SMC. The review stated: "Not only did the



In a recent comparison in InfoWorld, SMC came in first.

SMC TokenCard Elite™ offer overall excellence (with excellent or very good scores in every category), it stood out for being among the easiest to install."

The SMC TokenCard Elite is 100% interoperable within IBM environments. It's also fully compatible with both IBM and IEEE 802.5 Token-Ring standards, fully software configurable, and backed by a lifetime warranty. You get lots of extras, too. Like free SNMP management.

But the story doesn't end there. SMC is not only the technology leader but also the low price leader.

In fact, with an incredible new price of \$249 in a 50-pack, and only \$299 for a single card, the SMC TokenCard Elite is priced far lower than any other Token-Ring adapter.

With SMC Token-Ring products priced 50% lower than typical solutions, that can translate into a savings of over \$35,000 per 100-node installation. Without your having to sacrifice quality, reliability or peace of mind.

EZStart: The ultimate installation and diagnostic tool.

EZStart

EZStart[™], SMC's new Windows-like autoconfiguration and test utility, makes installation and troubleshooting a snap.



In fact, according to independent network testing laboratory LANQuest Labs, EZStart is "head and shoulders above the others."

In the unlikely event you'll need it, you're also guaranteed the service and support of a company that's been in business for 23 years and has over 6 million nodes installed.

So before you make another Token-Ring purchase, talk to SMC. In addition to the world's best adapters, we offer a full line of intelligent and stack-

able MAUs and hub cards that deliver the lowest cost per managed port in the industry.

SMC also has the industry's first switching hub that supports Token-Ring and the first HMI-compliant Token-Ring hub card.



For information on a free 30-day evaluation kit, call 1-800-SMC-4-YOU.

Contact us today and find out why, if you're not using SMC in your Token-Ring network, you're settling for second best. And paying for it.



ROUNDUP

MFS looks to pry open switched service mart

BY BILL BURCH

Washington, D.C.

MFS Communications Corp. last week asked the FCC to rework the way local carriers subsidize service for rural and low-income users, a change that could eventually pave the way for nationwide competition in the local switched service market.

In a separate move, MCI Communications Corp. last week urged the Federal Communications Commission to reject AT&T's proposal to restrict foreign carriers' access to the U.S. market until U.S. carriers are treated more fairly abroad.

In its turn at the FCC, MFS Communications asked the commission to change the rules under which local carriers contribute to the Universal Service Fund — the national program that guarantees telephone service for rural and low-income users.

One way local exchange carriers have resisted competition in the local switched service market has been by claiming they would need to raise rates for rural and low-income users if competitive access providers were allowed to steal away local exchange carrier revenues from business custom-

The local exchange carriers subsidize the rates for rural and low-income users under complicated and obscure accounting practices that involve charging more for business services and higher long-haul carrier access

MFS Communications proposed that local carriers instead should contribute to the Universal Service Fund through a new independent fund administered by a neutral third party that would pay for universal service as needed across the country. Carriers would pay based on their overall revenue and access lines served.

Federal regulators could then consider opening the local switched services market to competition from MFS Communications and other competitive access providers that currently are largely confined to offering private

MFS Communications asked the FCC to convene a special hearing to reexamine universal service, including the amount of subsidies needed to preserve universal service and how those subsidies would be funded.

OTHER STRATEGIES

Reworking the Universal Service Fund is just one way competitive access providers are preparing to compete with local exchange carriers in the local switched services market. MFS Communications last week said it advocates holding the local exchange carriers to a market penetration test before they are given full pricing flexibil-

Under such an arrangement, local exchange carriers would have to lose a certain percentage of their See MFS, page 8

Wellfleet taps IBM for service and support boost

IBM to focus its efforts on hardware support.

Digital Equipment

Corp., GTE Corp., IBM, Harris Corp.

NCR Corp.

AT&T Network Services, GE Computer

Services, ComputerVision Corp., Data General Corp.

Data General

Not applicable

ComputerVision

IBM.

BY MAUREEN MOLLOY

Cabletron Systems, Inc.

Cisco

Chipcom Corp.

SynOptics Com- NA

munications, Inc.

3Com Corp.

Ungermann-

Wellfleet Com-

NA = Not available

longed

munications, Inc.

Billerica, Mass.

Wellfleet Communications, Inc. and IBM last week announced a partnership under which IBM will deliver on-site maintenance and technical support to Wellfleet users building enterprise networks.

Hub and router vendors' service

and support resources

NA

NA

11.9

11.6

12.7

would

225

180

partnership

source for their router-based internets.

Blue's giant support staff provides a

greater comfort level to users, particu-

larly those whose nets support mission-

critical applications and where pro-

unacceptable. IBM has more than

20,000 field engineers, which will quin-

tuple the number of support people

Cheyenne Software, Inc. in Roslyn

Heights, N.Y., is one user who wel-

support because when your network

goes down, you want it fixed yesterday," he said. "Even if you're not a

bank that's losing money when the net

goes down, you still have your end users

users will receive on-site hardware sup-

port through IBM's Service and Mar-

keting organization. The agreement will

take effect in the U.S. initially, and later

worldwide. IBM will supplement Well-

fleet's own support staff and service

offerings, which include remote diag-

nostics, a help desk and hot lines. Well-

fleet will continue to handle most soft-

point of contact for all user problems.

Upon receiving a support call from a

user, Wellfleet service engineers will

Wellfleet will continue to be the first

ware-related glitches.

Under the new service alliance,

Joe Goldberg, network manager at

"There's no such thing as too much

downtime

available to Wellfleet customers.

comed the new pairing.

killing you.'

Wellfleet tapped IBM because Big

perform a diagnostic evaluation to determine the nature of the network problem, and if the problem is hardware-related, an IBM customer engineer will be dispatched to the user site.

IBM will carry the necessary spare products and parts at its field locations to provide immediate service to Well-

> fleet users. An automated IBM logistics system that manages the deployment of spares will help Wellfleet track inventory lev-

Wellfleet also will provide IBM personnel with product training on a continuous basis.

There will be no cost to users for the upgraded support service.

Wellfleet rival Cisco Systems, Inc. last year penned a similar deal with NCR Corp.'s Customer Service Division whereby NCR provides the hardware service and support for Cisco's routers worldwide.

NCR's 11,000 interna-

significantly tional field engineers, at 1,100 service strengthens Wellfleet's support offercenters in more than 120 countries, can ings by providing its large users - many be dispatched to provide on-site hardof whom have multinational operations ware maintenance and replacement. - with an extensive hardware service

Jeff Kaplan, director of worldwide services at Framingham, Mass.-based market research firm Dataquest, Inc., said that most router vendors have generally received positive reviews from users about their service and support capabilities. But as router-based internetworks grow, it is getting more difficult for internetworking equipment vendors to meet users' service needs.

Most vendors are now teaming with vendors that have large support organizations to improve the quality of their

service and support. "The internetworking vendors now recognize that product features alone will no longer be sufficient to differentiate themselves in this fast changing marketplace," Kaplan said. "Due to the rapid changes and the confusion it's creating among users, these vendors have begun investing more heavily on the quality of their service and support, both directly and indirectly.

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AT&T, 3Com make for strange bedfellows in fast Ethernet deal

BY SKIP MACASKILL

Santa Clara, Calif.

3Com Corp. and AT&T Microelectronics — previously rivals in the fast Ethernet battle - last week surprised observers by agreeing to jointly develop silicon for the 100M bit/sec Ethernet proposal backed by

According to industry experts, the move could confuse users mapping out purchase plans for fast Ethernet products, which have just started coming to market. The nascent market has already been muddied by squabbling between vendors backing different fast Ethernet specifications, as well as commitments by some vendors to back both leading technology specifications.

3Com and AT&T will codevelop a processor for the physical media-dependent layer of the 100Base-T draft standard, which keeps the collision detection layer of 10M bit/sec Ethernet intact.

The chip will be ready for use on network interface cards and wiring hubs by mid-1994, enabling them to support 100Base-Tapplications running on Category 3, 4 and 5 unshielded twisted-pair

Ironically, AT&T has been a leading proponent of 100Base-VG, the leading alternative fast Ethernet specification to 3Com's 100Base-T proposal. The

100Base-VG draft standard discards Ethernet's carrier-sense multiple access with collision detection layer and uses a four-pair wire signaling scheme.

The battle between the two fast Ethernet camps has been bitter and confrontational. Based on that history, analysts were surprised by AT&T's move to embrace a member of the rival camp.

"This is interesting in that one of the original proponents of 100Base-VG is now saying that the CSMA/CD proposal is quite viable and will be something worth supporting," said Todd Dagres, vice president of data communications at The Yankee Group, a Boston consultancy

"It's good news for the CSMA/CD guys, good news for 3Com and probably bad news for HP" since one of its biggest allies — AT&T — has given credibility to a rival's alternative, he added.

For AT&T, the deal was a no-brainer in that the carrier is 3Com's biggest sili-

"We're in the chip business, not the standards business," said Bob Bailey, vice president of network computing products for AT&T in Allentown, Penn. "Ironically, this is something we've been planning with 3Com since Day One, but now that each standard is in its own working group under the IEEE 802.3 committee, we don't see a conflict of interest."

AT&T remains committed to the 100Base-VG proposal and will continue to work closely with HP to develop chipsets for that technology, he added.

According to Dagres, the 3Com-AT&T announcement may further cloud the fast Ethernet issue for users.

"Things may even be more confusing because it looks like we're going to have two sets of products based on two standards coming out of the same company," he said. "This is probably the 10th company that has announced support for both proposals, which is good and bad news for users: good that they have an option, but bad in that it makes it more difficult to chose."

Fast Ethernet camps take shape Major 100Base-T backers:

- Cabletron Systems, Inc.
- Chipcom Corp. David Systems, Inc.
- **Grand Junction**
- Networks, Inc. Intel Corp.
- National
- Semiconductor Corp.
- NetWorth, Inc. Racal-Datacom, Inc.
- Sun Microsystems Computer Corp.
- SynOptics Communications, Inc
- 3Com Corp.
- Major 100Base-VG backers Hewlett-Packard Co.
- Proteon, Inc.
- Ungermann-Bass, Inc. Wellfleet Communications, Inc.

Backers of both technologies

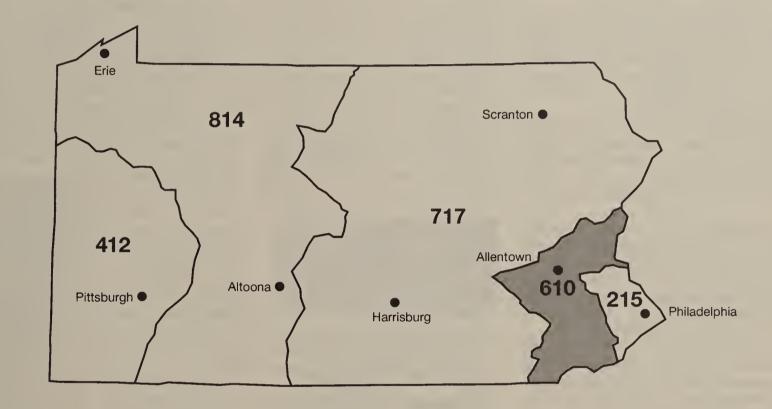
- AT&T Microelectronics
- Kalpana, Inc.
- Novell, Inc.
- Standard Microsystems Corp. SOURCE: NETWORK WORLD GRAPHIC BY TERRI MITCHELL

CORRECTIONS

A news brief in the Oct. 25 issue incorrectly stated that Gupta Corp. will resell Informatica Corp.'s RightStart tool kit. Gupta will reference the product but stop short of reselling it.

The story "Horizon, Momentum announce merger" in the Oct. 18 issue used an incorrect name for Horizon Strategies, Inc., which has merged with another company to become Momentum Software Corp. Horizon Strategies is not to be confused with Horizon Technology, Inc., a systems integrator and software developer in San Diego.

ON JANUARY 8, 1994, PENNSYLVANIA WILL ADD A NEW AREA CODE: 610.



For telecommunications managers, this will mean designating 610 as an area code in Customer Premises Equipment as of January 8, 1994. It will also require updating automatic call-routing systems, automatic dialers, modems, fax dialers, electronic networks, and mobile, cellular, and wireless equipment. Your Customer Premises Equipment vendor can advise you on other equipment that might be affected.

For everyone, it will mean dialing the new area code when calling into Pennsylvania's 610 area. It will also mean updating, as appropriate, Area Code 215 speed-dial-

ing numbers to 610 on home and business phones, cellular phones, fax dialers, and other automatic dialers.

Area Code 610 will be operational as of January 8, 1994. Its use will become mandatory for call completion as of January 7, 1995.

For more information, call your Customer Premises Equipment vendor or your telephone company representative.

Bell of Pennsylvania



Vision

Continued from page 1

Work began on DRDA in 1986, with Version 1 of the DRDA specifications released approximately three years ago. IBM has already reworked its own databases to support key capabilities spelled out in DRDA, which relies on SQL for data access, and details security, data integrity and other characteristics required for distributed databases.

But in contrast to an earlier era in which IBM established its Systems Network Architecture as a primary blueprint for computer networking, IBM has not been able to drum up the support it needs to make DRDA an industry model.

"IBM came to us to push DRDA, and our overwhelming reaction was, 'This isn't really a big deal.' We feel IBM is unrealistic in imagining that customers are still looking to them for the definitive solution," said the chief information officer of a West Coast financial organization who asked not to be named.

"The days are gone when IBM could introduce a specification and expect that customers would wait with baited breath for products and implementations to appear," said Richard Finkelstein, president of Chicago-based Performance Computing, Inc.

Currently, only a limited number of products support DRDA, and IBM has only vague commitments from database and database tool vendors for future support. IBM has licensed DRDA to 14 vendors, five of which have actually shipped DRDA-compliant products. Most companies are taking a waitand-see attitude before devoting resources.

"We have announced we will provide a product that addresses the linkage between our products and IBM's DRDA architecture, but we have not seen the customer demand that warrants devoting significant resources to the project," said Josh Bersin, product manager for IBM platform products for Sybase, Inc.

To date, the only database vendor actually supporting DRDA is Informix, Inc. "Our Informix-Gateway with DRDA is a key product for customers on the Unix platform who need to interact with DB2/6000. We believe DRDA will provide an easy migration path for rightsizing systems and will enable developers to take advantage of mainframe DB2 data," said Tim Shetler, vice president of product management at Informix.

Other companies currently supporting DRDA include Wall Data, Inc., which markets a product that gives Windows users access to DB2; Cross Access Corp., with a product that connects relational and nonrelational databases on DOS, OS/2 and Windows machines to access DB2; and XDB Systems, Inc., which released the first DRDA server for desktops.

"Informix beat our DB2/6000 product to market, and XDB put us in the same situation at the workstation. Yet, I'm excited by the fact that other vendors consider DRDA enough of a market opportunity to rush products to market in such a timely fashion," said George Zagelow, IBM manager of distributed data strategy and architecture for IBM.

But those products are the few bright spots in the overall pic-

ture, which poses a problem for IBM because DRDA is a critical component in the company's efforts to position itself as a provider of client/server solutions.

Zagelow said one reason vendors have been slow to provide DRDA-enabled products is that the market for alternative solutions, such as gateways between DB2 and other relational databases, is a lucrative one. Gateways allow a third-party database to access DB2 data, usually at a read-only level, but can add significant processing overhead — a price customers are apparently willing to pay. "The gateways provide a very lucrative and easy cash flow," he said. "Why should vendors rush to implement DRDA if they will be reducing a significant revenue item?"

"DRDA implementations by the thirdparty database vendors would probably result in better performance and reduced systems overhead," said Judy Davis, an independent database analyst in Lexington, Mass. "Yet the central question is when customers will want DRDA, which comes back to the question of how effectively IBM can sell DRDA as a standard for distributed relational databases."

Another impediment to DRDA acceptance is the fact that the specification only addresses access to relational databases. That's a problem for users that need information from both relational and nonrelational systems. DRDA support for nonrelational data, though on IBM's list, is not likely to appear in the foreseeable future.

"One of the most critical aspects today is integrating the full range of data that exists throughout companies. DRDA doesn't address this need, and it is unlikely IBM will

Who's backing DRDA	nsed the A litecture	ounced DRDA ementations	ped DRDA ementations
Company	Lice	Anni	Ship
Borland International, Inc.	1		
Cincom Systems, Inc.	~		1
Cross Access Corp.	1		
Information Builders, Inc.	1	V	
Informix Software, Inc.	1	V.	V
Ingres	1		
Micro Decisionware, Inc.	V.	1	V
Novell, Inc.	~		
Object Technology International, Inc.	~	~	1
Oracle Corp.	~	V	
Progress Software Corp.			
Sybase, Inc.	~		
Wall Data, Inc.	1		
XDB Systems, Inc.	1	V	V
DRDA = Distributed Relational E GRAPHIC BY SUSAN J. CHAMPENY	Database SOURCE: (IBI		

Salvation

Continued from page 1

because we don't have to keep adding segments every time we add a few more users. We were also able to redeploy existing gear in this environment and not incur any rewiring costs."

Previously, Mentor had a router-based Fiber Distributed Data Interface backbone that serviced a campus net of four buildings and 1,000 users. The net was divided into about 70 subnets, which included a combination of Ethernet and token-ring work groups.

Each segment had a direct Ethernet link back to one of four Cisco Systems, Inc. AGS+ routers in the central com-

To help determine its net

Graphics Corp. used the LADDIS benchmark

specification, which was

established in February

1990 by the following

Legato Systems, Inc.

Auspex Systems, Inc.

Digital Equipment Corp

Sun Microsystems, Inc.

common benchmarks to measure Network File

performance and capacity

as a function of attached

network and storage

devices.

Data General Corp.

Interphase Corp.

LADDIS is a set of

System file server

companies.

requirements, Mentor

puting center that were interconnected via a dual-attached FDDI ring. This setup put a tremendous strain on the Cisco routers since virtually all net passed through them. In addition, some traffic was double-routed because the token-ring segments were front-ended by Proteon, Inc. P4100 token ring-to-Ethernet routers.

The fact that file servers and other resources were scattered across the network created more traffic overhead because user queries sometimes had to go through several

router hops to reach their destination.

When Mentor made the decision to upgrade its high-end workstations to even more powerful Hewlett-Packard Co. 9000 Series 700 workstations, it became readily apparent that the net could not handle the added strain.

"Two of those machines on the same piece of Ethernet could saturate the segment, so you can imagine the nightmare that 20 or 30 of those workstations on one work group would pose," Thomsen said.

After running a benchmark test to determine the maximum load capacity of the network (see graphic, page 1). Mentor discovered an Ethernet segment could support 10 Series 700 machines during regular operation.

To provide a performance buffer, the company limited the subnets to a maximum of eight Series 700 workstations and upgrade its Auspex Corp. file servers to FDDI once interfaces were available from Auspex.

With the goal of increasing performance and keeping the cost of any upgrade to a minimum, Mentor looked

at several routing and switching options. Ethernet switching proved to be the best alternative.

be able to effectively deal with this situation within the context

of a DRDA-compliant world," said Bill Maderas, corporate

sales and marketing director for Information Builders, Inc., a

New York-based firm that sells the EDA/SQL line of products.

EDA/SQL provides access betweeen relational and nonrela-

conundrum. Unless IBM can persuade customers to demand DRDA support, the architecture will continue in the nether

world of technology, frighteningly akin, at least from IBM's

viewpoint, to that of another "standard" - Systems Applica-

tion Architecture — IBM's failed plan for application unity. Z

For now, IBM seems to be facing the classic chicken-and-egg

It required no changes to the desktop and offered the needed performance gains by delivering dedicated 10M bit/sec links between each subnet and the servers, which were moved to the data center to make them easier to manage, back up and secure.

"From a performance viewpoint, it was a fairly easy decision," Thomsen said. "In the routed environments, we could only get throughput of about 15,000 packet/sec as opposed to a switched approach that could deliver 50,000 packet/sec."

Financially, it was also easy to costjustify, he added.

"Previously, because of the number of collisions that would occur in a routed net, we had to assign less workstations to each router port. That meant creating more subnets, which required more routers."

Mentor placed a Synernetics, Inc. LANplex 5000 switching hub in each of the four buildings on campus. Each 5000 contains a four-port FDDI concentrator and three Ethernet Switching Modules (ESM), and is linked back to one of seven 5000s in the data center via three

100M bit/sec FDDI pipes. The data center 5000s, in turn, are connected to the centralized servers and the four routers via Ethernet.

In the new configuration (see graphic, page 1), Fibermux Corp. Crossbow hubs supporting work group LANs on each floor feed traffic into a single 5000, which provides switched access to the centralized resources.

Only when a user needs access to another work group in the same building or to one in a separate building does traffic have to pass through a router.

"We organized the subnets into work group cells that are working together on the same project or application, meaning, in theory, that 90% of the traffic remains local to that cell," he said. "The routers now have less to do because [of that]."

For Mentor, the new net has brought much-needed relief. "The bottom line is that instead of having 20 screaming engineers on a routed subnet, we can give 50 to 60 engineers on different subnets switched access to a centralized set of net resources," Thomsen said.

MFS

Continued from page 6

markets before they would be completely free to compete with competitive access providers.

The local exchange carriers, meanwhile, have other ideas on how soon pricing flexibility should be allowed.

In exchange for expanded interconnection to local exchange carrier networks sought by competitive access providers, Ameritech has proposed it be granted pricing flexibility before it loses a large chunk of its revenues to the new carriers.

Also, the regional Bell holding company would like the Consent Decree's ban on long distance for the Bells repealed.

Other action at the FCC last week included MCI opposing AT&T's proposal on limiting foreign carriers' participation in the U.S. market.

MCI wants to expand its international presence through an alliance with BT.

In June, BT acquired 20% of MCI and the two companies announced plans to form a joint venture to provide services worldwide.

AT&T threw up a regulatory roadblock in September, however, by asking the FCC to place restrictions on foreign carriers' entry into the U.S. market.

AT&T said if a foreign carrier is to be allowed into the U.S., domestic carriers must be allowed comparable access to the foreign carrier's home market. Also, AT&T said the FCC should set up rules to prevent a foreign carrier from using its home market power to favor a U.S. affiliate while discriminating against other U.S. carriers.

MCI countered that AT&T's true intent was to discourage alliances with or between foreign carriers that might threaten AT&T. While MCI said it favored opening foreign markets, the FCC should not prevent alliances with foreign carriers that could provide users with a wider selection of international services.

"The transparent intent of this AT&T proposal is to thwart the efforts of competitors, specifically MCI and BT, to participate vigorously in the international telecommunications market," MCI stated.

Intersolv enters GUI client/server tool mart

APS for Client/Server to allow team development.

BY WAYNE ECKERSON

Leveraging its expertise in IBM host environments, Intersolv, Inc. this week will announce a GUI-based version of its APS application development tool that can access a wide range of heterogeneous data-

APS for Client/Server represents a complete overhaul of Intersolv's APS tool, which previously enabled developers to build character-based applications for MVS mainframes running IBM databases, such as DB2 and VSAM.

The new graphical user interface-based software builds on APS' mainframe heritage. It enables teams of developers to generate OS/2 and Windows client applications that can access IBM host databases via IBM's Advanced Program-to-Program Communications protocol. It also generates applications that can access relational databases from IBM, Oracle Corp. and Sybase, Inc., running on Unix and personal comput-

'Sixty percent of the product has been redeveloped from the ground up," said Mike Gilpin, director of marketing at Intersolv

A key new feature of APS is Client Express, a point-and-click tool that lets developers on OS/2 or Windows PCs rapidly generate client/server applications without

"The new version of APS looks promising as a point-and-click development environment," said Dan Howarth, project manager at Valero Energy Corp. in San Antonio, Texas. Valero is using APS to develop an OS/2 application that accesses IBM's DB2 relational database on a MVS/CICS server.

However, Howarth said APS' GUI painter lacks a few control functions, such as the ability to disable items in a pull-down menu. "They've got all the basic functions; they just need to beef it up in a few places, which they are doing," he said.

Howarth added that what differentiates APS from other rapid prototyping tools, such as Powersoft Corp.'s PowerBuilder, is its ability to generate large-scale decision support and transaction processing applica-

"We're very concerned about scalability because we've used low-end tools, such as Microsoft's [Corp.] Visual Basic, that generated applications that worked well in LAN [local-area network] environments, but could not handle increased volumes when deployed on an enterprise scale," Howarth said.

One reason APS for Client/Server is scalable is because it uses IBM's APPC to provide direct access to host-based systems, which many companies still use to handle mission-critical transaction processing appli-

APS for Client/Server simplifies the process of using APPC because it maps APPC calls

directly into APS' specification language. This shields application developers from having to learn the complexities of APPC. In contrast, other client/server tools use thirdparty gateways to access legacy systems, an option that can result in slower performance, Gilpin said.

However, Howarth noted that reconfiguring communications controllers, operating systems and transaction monitors to run APPC can be extremely complex and timeconsuming, especially if a company has no

APPC experts inhouse.

"I built a prototype client/server application with APS in two days, but it took us nine months to implement it," Howarth said. "But it was worth the effort because now we have excellent performance and we are set up to implement other client/server applications quickly."

development environment to meet special application, communications or data access requirements, Gilpin said. Developers can toggle out of Client Express to APS' highlevel specification language based on SQL.

To achieve even greater control, developers can use an APS macro language to change

> environment is based. This virtually eliminates the need for developers to drop down into C to customize a program, Gilpin said.

> "The dirty secret of most first-generation client/server graphical tools is that once you get past the GUI," developers still have to write a lot of code, Gilpin said.

> Another advantage of APS is that it can be easily integrated with Intersolv's other software development tools - Excelerator, PVCS and Maintenance Workbench — to provide a comprehensive environment for designing, configuring, generating and main-

taining client/server applications.

APS for Client/Server also differs from other client/server tools in that it does not require users to purchase proprietary runtime modules to generate executable code. APS-generated applications essentially are a composite of APPC or Transmission Control Protocol/Internet Protocol code, SQL

©Intersolv: (301) 230-3200.

Intersolv's APS for Client/Server development tool

Windows and OS/2

Generates:

Windows and OS/2

OS/2, MVS and CICS server programs

MVS batch processes

Databases supported:

IBM DB2, DB2/2, DB2/6000, SQL/400, IMS, VSAM

Oracle Corp.'s Oracle Server

Sybase, Inc.'s SQL Server

GRAPHIC BY TERRI MITCHELL

APS also lets developers extend the

the rules upon which the APS graphical

and industry-standard COBOL. APS for Client/Server will ship in December and cost \$4,000 per developer.

ELECTRONIC MAIL

Banyan adds Unix to list of Intelligent Messaging clients

The service is

fully integrated

with Banyan's

global directory

service,

Santa Clara, Calif.

Banyan Systems, Inc. last week opened the door for the delivery of its Intelligent Messaging service beyond PC-based nets to Unix-based servers and clients.

The Intelligent Messaging interface for

Unix, announced at the E-Mail World Conference here, lets companies with mixed Unix workstation and personal computer networks use the same electronic messaging service across all desktop operating systems.

Streettalk III. That's a significant step in Banyan's plan to spread its enterprise network services across as many systems as possible because E-mail is one of the key elements of an enterprisewide communica-

tions plan, said Stan Schatt, an analyst with the Santa Clara, Calif.-based consultancy

"And since the Unix market is the area where everybody sees some serious growth potential over the next few years, it's also important that they've got their foot in that

door," Schatt said.

Banyan's Intelligent Messaging software provides message transport and management functions for E-mail front ends and mail-enabled applications from several vendors, such as Beyond, Inc.'s Beyond Mail and Microsoft Corp.'s

Mail for Windows.

Previously, the product supported only DOS, Windows, IBM OS/2 and MacIntosh clients. Unix clients could send messages to

these PC clients only through a Simple Mail Transfer Protocol gateway.

The Intelligent Messaging interface for Unix will run as an optional service on a VINES for SCO Unix server. Any Unix workstation, X terminal or PC running terminal-emulation software that has access to the VINES for SCO server can exchange messages with other users of the Intelligent Messaging service throughout the enter-

The service is fully integrated with Banyan's global directory service, Streettalk III, which means the Unix workstation or terminal is simply viewed as another address in the directory, regardless of where it sits.

Banyan plans to offer the Intelligent Messaging interface for Unix across Hewlett-Packard Co. HP-UX, IBM AIX and Sun Microsystems, Inc. Solaris operating systems when it rolls out VINES for Unix products for those flavors of Unix next year.

The Intelligent Messaging Interface for Unix is available immediately as an option to VINES for SCO Unix and is bundled with that product free of charge until Dec. 31. After that date, the price will be \$895.

©Banyan: (508) 898-1000.

NobleNet RPC compiler speeds apps development

BY WAYNEECKERSON

Southborough, Mass.

NobleNet, Inc. this week will make building Windows-based client/server applications easier when it starts shipping a new version of its remote procedure call (RPC) compiler that conforms to the WinSock TCP/IP interface.

NobleNet's WinRPC 2.0 compiler generates RPCs that bind Windows clients to Unix and Novell, Inc. NetWare servers across Transmission Control Protocol/Internet Protocol networks.

The WinRPC 2.0 compiler generates RPCs that work with any TCP/IP software complying with Win-Sock, an interface between Windows applications and TCP/IP network transport software.

WinSock was developed by a vendor consortium and has been implemented by more than two dozen TCP/IP vendors, including Frontier Technologies, Inc. and NetManage, Inc.

"Our WinSock-compliant RPC compiler allows developers to build client/server applications that can be run without modification across any Windowsbased TCP/IP software," said Dennis Ford, president of NobleNet.

The previous version of WinRPC only supported TCP/IP software from NetManage, Novell, Inc. and Sun Microsystems, Inc.

Charlie Billings, a software engineer at Marcam Corp., a maker of manufacturing software in Newton, Mass., said the WinSock-compliant version of WinRPC will significantly reduce the time it takes to generate client/server communications code. Currently, Billings must recompile RPC files every time he uses a different TCP/IP stack.

"A WinSock-compliant version of WinRPC will enable me to generate one set of code that works across almost any TCP/IP stack I'm using," he said.

Billings said he has yet to come across another tool on the market that generates RPCs for Windows programs as easily as NobleNet's WinRPC.

"Other RPC tools, such as Microsoft's implementation of [Open Software Foundation, Inc.'s Distributed Computing Environment] RPC, are about as flexible as a tin can," he added.

WinRPC generates two types of RPCs: SunSoft, Inc.'s Network File System RPC and the Transport Independent RPC, which comes bundled with Net-Ware 3.11 and 4.0, as well as Unix System V Release 4.

NobleNet also has entered into an alliance with IBM to develop compiler software for OSF's DCE RPC. That compiler is scheduled to ship in mid-1994, Ford said. WinRPC generates RPCs in the form of Dynamic Link Libraries, which can be called from any Windows program or any high-level visual programming language, such as Microsoft's Visual Basic and Powersoft Corp.'s PowerBuilder.

For more traditional programmers, NobleNet offers the EZ-RPC compiler, which generates C source code for Unix systems. NobleNet also sells RPCware, which generates NetWare Loadable Modules for building client/server applications on Novell net-

WinRPC 2.0 is available now and sells for \$995 per developer. A five-user version costs \$2,500.

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Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.



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ENTERPRISE INTERNETS

Data Network Architectures, Standards, Equipment and Management

ATM switch features outdo standard

BY JIM DUFFY

Three recent ATM switch announcements suggest current standards may not go far enough in defining adequate flow control and congestion management for ATM networks.

StrataCom, Inc., Motorola Codex and Digital Equipment Corp. have implemented class-of-service features in their Asynchronous Transfer Mode switches that go beyond what the ATM Forum defines. That means users with mixed public/private ATM nets will be forced to take a performance hit.

"You're not going to build a private ATM net based on a hodgepodge of switches," said Kathryn Korost-off, a principal at Sage Network Research in Newton, Mass. "If you've got a private ATM network and you want to use service from carriers [that have different switches], you might lose some of the quality-of-service functionality.

The ATM Forum currently defines four classes of transmission service over ATM networks: Constant and variable bit rate service for connection-oriented service, and the same two for connectionless-oriented

In a different class of service Chooses optimum path through an Asynchronous Transfer Mode (ATM) network based on traffic StrataCom, Broadband-IPX type, preferred routing requirements and 32 classes of service. Supports switched virtual circuits. 6950 SoftCell ATM Provides unified call Networking Node routing, queuing and Motorola routing, queuing and congestion control services that are configurable for particular applications. Support credit-based LAN traffic transmission scheme Unnamed premises and and features that reduce delays caused by congested output ports.

But vendors feel the current standard is incomplete. StrataCom, for example, recently announced new OptiClass software for its Broadband-IPX switch that provides 32 different classes of service.

SOURCE: NETWORK WORLD

StrataCom developed OptiClass because the ATM class-of-service standard treats delay-sensitive Systems Network Architecture data the same as delay insensitive LAN data, said Brian Button, StrataCom director of product marketing.

"All are given the same level of service, but all have different performance requirements," Button said.

Proprietary class-of-service schemes should not impair interoperability between multivendor ATM switches, Button said. All ATM switches will conform to the ATM Forum class-of-service standard as the ''lowest common denominator.''

That's more of a warning sign to users than a sign of reassurance, analysts say.

"Will that impair your functionality?" asked Thomas Nolle, president of CIMI Corp., a Voorhees, N.J., consultancy. "Yes, absolutely. Users have to make an adaptation at the network interface and pay whatever penalty associated with that when they See ATM, page 12

Unisys revamps its **SNA-Unix product line**

Offers up new gateway, emulation products.

BY MICHAEL COONEY

San Jose, Calif.

Unisys Corp. this week will toss out its outdated SNA mainframe-to-Unix connectivity product line and bring in some new

The company's Enhanced Systems Network Architecture (e/SNA) suite of products consists of a new SNA gateway, a Unix implementation of IBM's NetView Distribution Manager (NVDM) software program, three 3270 emulation packages and an SNA application developers tool kit.

All of the products are built on top of SNA technology licensed from Data Connection, Ltd. (DČL), an SNA software developer based in London. DCL's SNAP-APPN software is already the underpinning of SNA support in a variety of products from vendors such as Microsoft Corp., Hewlett-Packard Co. and Cabletron Systems, Inc. The company is the only vendor besides IBM

that issues Advanced Peer-to-Peer Networking software licenses.

"We decided our previous SNA-Unix products did not keep us on a level playing field with the rest of the market," said Robert Nelson, program manager for IBM host communications in the firm's client/server Unix systems division.

The first new product, the e/SNA Gateway, is software that works on a Unisys U6000 Series workstation running Unix System V Version 4. It provides emulation for up to 250 PU 2 (3270) or 32 PU 2.1 devices and supports all standard SNA logical unit types from LU 1 to LU 6.2.

Synchronous Data Link Control lines are supported at speeds up to 19.2K bit/sec using an RS-232 interface and at up to 56K bit/sec using an RS-449 interface. The gateway also

provides mainframe access for users on 4M or 16M bit/sec token-ring local-area networks and X.25 Qualified Logical Link Con-

"In the past, we didn't support LU 6.2 sessions or token-ring connections to our gateway," Nelson said.

Unisys also announced the e/SNA Distributed Systems Node Executive-Emulator (DSNX-E), software that works with the See Unisys, page 12



AT&T Paradyne, Digicom release multimedia modems

BYJIM DUFFY

All the hype accompanying multimedia usually includes mention of a requirement for some whiz-bang new and expensive — networking gear.

Users who shy away from new and unfamiliar technology can take comfort in announcements from AT&T Paradyne and Digicom Systems, Inc. Both companies are rolling out modems . . . yes, modems . . . for multimedia applications.

AT&T Paradyne last week brought out the AT&T DataPort 2001 Multimedia Communicator, a 14.4K bit/sec modem that allows users to send and receive still images, graphics or data while talking on the telephone.

The DataPort 2001 allows standard telephone lines to support voice while simultaneously transmitting data at up to 4.8K bit/sec. The modem is based on AT&T technology, called VoiceSpan, that splits a single phone line into two virtual channels that support concurrent voice and data transmission, including images.

For example, an architect in New York can discuss a design with a client in Europe while, over the same telephone line, the design appears on computer screens in both locations.

The DataPort 2001 can also serve as a data/fax modem supporting line speeds of 14.4K bit/sec. The product costs less than \$600 and will be available in the first quarter of 1994.

AT&T plans to license its VoiceSpan technology to other modem vendors and chipset suppliers.

Digicom, meanwhile, will introduce at Comdex next week Sound Connection, a software upgradable sound and modem card. Sound Connection combines 16-bit stereo sound and 14.4K bit/sec data/fax/voice modem capabilities on a single Digital Signal Processor-based personal computer

Unlike the AT&T Paradyne Data-Port 2001, Sound Connection cannot simultaneously send voice, music or other audio traffic across the same phone line as data and image. Users have to switch between modem and sound applications.

Sound Connection uses Digicom's SoftModem technology in which modem and sound algorithms are loaded from a software disk onto the Sound Connection board's memory. Users can change the personality of the modem board by downloading different modem algorithms onto the board's random-access memory.

This obviates the need to purchase separate modem cards to take advantage of different speeds. Sound Connection costs \$299 and

will be available in December. OAT&T Paradyne: (813) 530-2000; Digicom Systems: (408) 262-1277.

Newbridge Networks, Inc. and ACC last week announced that they are expanding their existing partnership to include further joint product development and marketing initiatives. In addition, Newbridge announced that it has increased its equity interest in ACC via a stock purchase that, when completed, will give Newbridge between 36% and 44% ownership of ACC.

Cisco Systems, Inc. last week signed an OEM agreement with Alcatel whereby Alcatel will resell Cisco products as its preferred partner for router equipment. The agreement also gives Alcatel the right to integrate Cisco's routing technology directly into Alcatel's System 4400 ATM-ready private branch exchange as well as its 1100 HSS widearea Asynchronous Transfer Mode switch.

Cisco also announced last week that it wil begin supporting the Simple Network Management Protocol Version 2 on its entire router line by the middle of next year. Cisco has licensed the SNMPv2 code from SNMP Research, Inc.

Independent network testing lab LANQuest last week announced a multiprotocol packet generator for testing bridges, routers and hubs. Called FlameThrower, the software runs on any IBMcompatible PC and is capable of mixing as many as 1,000 combinations of protocols and packet sizes in a single transmission script.

FlameThrower is available now and costs \$1,995 for an Ethernet or token-ring configuration, \$2,995 for an Ethernet and token-ring configuration and \$5,995 for a Fiber Distributed Data Interface configuration.

LANQuest: (408) 894-1000.

HP is the latest company to invade low-end router market

BY MAUREEN MOLLOY

Palo Alto, Calif.

Another vendor joins the low-end router fray

How Hewlett-Packard Co.'s HPJ2540A Router PR stacks up against 3Com Corp.'s

NETBuilder Remote Control router and Cisco Systems, Inc.'s Cisco 2000 router.

Yes

\$3,195

Cisco's 2000

1 LAN, 1 serial port

up to 1.5M bit/sec;

AppleTalk, bridging

X.25, frame relay

TCP/IP, IPX,

Joining a throng of vendors in a market that appears to be growing weekly, Hewlett-Packard Co. last week unveiled a low-end router that tops the competition by sporting the lowest price tag to date.

Like the spate of other low-end routers introduced this year that target the remote branch office, the new HP 12540A Router PR addresses key user requirements such as simplicity, centralized network management and, perhaps most importantly, low price.

The router costs \$2,995, almost \$200 less than a similarly featured router from Cisco Systems, Inc. and \$500 less than 3Com Corp.'s low low-end offering (see graphic, this page).

HP's router supports the Transmission Control Protocol/Internet Protocol and Novell, Inc.'s Internetwork Packet Exchange (IPX) as well as various bridging techniques.

HP's HPJ2540A

1 LAN, 1 serial port

up to 1.5M bit/sec

Router PR

TCP/IP, IPX,

bridging

No

No

\$2,995

The two-port device comes equipped with a single

Ethernet and one synchronous port that supports

wide-area network links at speeds up to T-1. The

router also supports V.25 bis so that the WAN port can

also be used to support dial-up links at speeds up to

boosting their data transmission capacities, the router

is outfitted with data compression software that offers

data traversing point-to-point links only, but a soft-

ware release expected in mid-1994 will provide com-

an average compression ratio of 4-to-1.

To further help users trim their phone bills while

The compression algorithm will initially support

pression over packet-switched networks such as X.25,

HP said the data compression software will also be available on its existing EtherTwist routers beginning

The HP J2540A Router PR will come equipped

The prioritization feature lets users divvy up WAN bandwidth into different priority levels and specify how much bandwidth is to be allocated to different types of data and applications. That means lower priority traffic will not be entirely barred from the WAN link even if high-priority data is chewing up large

Beginning next month, the traffic prioritization

available on HP's existing EtherTwist routers.

To keep router deployment and management simple, the HP J2540A Router PR is equipped with flash erasable programmable readonly memory that enables users to remotely configure the devices from any Simple Network Manage-Protocol-

compliant network management system.

3Com's NETBuilder Remote Control

1 LAN, 1 serial port up to

TCP/IP, IPX, AppleTalk, XNS,

DECnet, OSI, VINES, bridging

7M bit/sec; X.25, frame

Yes

Yes

\$3,495

The device can also be managed from any SNMPbased net management system via the router's RS-232 port and accessed in-band using Telnet terminal emu-

price on its HP 28674B Remote Bridge from \$2,950 to \$2,495 and on its HP 27289A Frame Relay Router from \$4,500 to \$3,995. The new prices will also

with traffic prioritization capabilities that improve the device's performance in shipping IBM Systems Network Architecture and other protocols across the

amounts of bandwidth.

and bandwidth reservation functions will also be

lation. Available Dec. 1, the router comes with a threeyear, on-site warranty.

HP also announced last week that it is dropping the become effective on Dec. 1.

©HP: (916) 785-7123.

Unisys

Continued from page 11

e/SNA Gateway. DSNX-E supplies support for IBM's host-based NVDM product, which handles centralized software distribution for SNA devices.

With DSNX-E, the U6000-based e/SNA Gateway can receive unattended software updates from the mainframe, such as operating system upgrades. The gateway then distributes the updates to downstream Unix nodes.

The firm also announced three new 3270 emulation packages. The e/SNA 3270 Emulator is software that resides on any U6000 and lets it emulate a 3270

controller, such as an IBM 3174 Establishment Controller. It can support as many as 10 sessions with a single mainframe.

The e/SNA remote job entry lets any U6000 submit jobs to the job entry system (JES) on the mainframe for processing. JES handles mainframe data I/O and scheduling for batch work such as mes-

The e/SNA TN3270 lets any U6000 act as a 3270

device and gain access to SNA resources over a Transmission Control Protocol/Internet Protocol net.

Finally, Unisys announced the e/SNA application program interface (API) tool kit for developing SNA applications. It includes APIs for IBM's Common Programming Interface for Communications (CPIC), Advanced Program-to-Program Communications and Network Management (NM) API.

CPIC and APPC will help users build applications that can communicate as peers across an SNA net using LU 6.2. NM API will let users build applications that support network management communications that work with Net View, IBM's host-based

e/SNA price breakdown

API = Application program Interface DSNX-E = Distributed Systems Node Executive-Emulator e/SNA = Extended Systems Network

All products are scheduled to be

(32 users)

\$1,850

\$1,975

No charge

No charge

No charge

e/SNA Gateway

Terminal Emulator

e/SNA TN3270

e/SNA DSNX-E

RJE = Remote job entry

e/SNA 3270

Emulator e/SNA RJE

e/SNA API

net management plat-

Nelson said the new APIs and any new applications developed with them will not be compatible with existing Unisys SNA applications.

"We will be making a portability guide available to users so that they can migrate existing applications to the new environment," he said.

©Unisys: (215) 986-

Continued from page 11

leave the boundary."

George Marshall, director of product marketing at Network Equipment Technologies, Inc.'s Adaptive division, and a member of various technical committees at the ATM Forum, acknowledges that the current class-ofservice standard is "basic." He said the forum is building on that work and the standard will change over time.

Meanwhile, Motorola Codex also went beyond the ATM standard with its class-of-service offering. The company's Portfolio Quality of Service software for its new 6950 SoftCell ATM Networking Node links call routing, queuing and congestion control into a unified set of services that users can configure for particular applications.

And DEC recently announced two premises ATM switches that feature proprietary flow control and bandwidth efficiency schemes (see graphic, page 11).

In the context of ATM, proprietary class-of-service schemes, for the moment, are not necessarily bad.

"The things that vendors are doing fall in the category of 'goodness'," said Robbie Forkish, president of RFTC, a Eugene, Ore., telecommunications consultancy. "But they add to the cost and complexity [of a switch]. Thirty-two levels of priority costs more than 16. Users have to determine how much is

ROUTERS

56K bit/sec.

LAN/WAN ports

Automatic

configuration

Dial-on-demand

Bandwidth-on-demand

GRAPHIC BY SUSAN J. CHAMPENY

Protocols supported

Wellfleet boosts X.25 offering

BY MAUREEN MOLLOY

Billerica, Mass.

Wellfleet Communications, Inc. last week nnounced that it has enhanced the X.25 support on its router line to improve efficiency and security when sending data over a publicswitched network.

The company has added a new feature, dubbed Fast Select, that reduces the overhead and delay associated with establishing and terminating X.25 sessions by increasing the amount of user data contained in call setup, call accept and clear request packets from 16 to 128 bytes.

This feature is especially useful for inquiry and response applications such as point-of-sale updates and credit card authorizations because it decreases the delay involved in setting up and breaking down the calls and negates the need for complex call setup proce-

Another feature, Extended Packet Sequence Numbering, increases X.25 efficiency by boosting from seven to 127 the number of packets that can be outstanding before an acknowledgment is required. This feature was added in an effort to better contend with the long propagation delay on satellite links.

Wellfleet has also added a feature called Reverse Charging, X.25's equivalent of a collect telephone call. It works by consolidating and forwarding data about all network connection times and usage charges to the destination data terminal equipment (DTE).

Wellfleet's Reverse Charging support is available on a per-call basis and is specified in a

call request packet sent out by the originating router. It works in tandem with the Reverse Charging Acceptance facility, which is software running in the destination router that enables it to accept the charges on behalf of the source node.

Reverse Charging Acceptance offers the added benefit of consolidating network usage charges from multiple incoming lines, which may qualify some users for volume discounts under a carrier's pricing structure.

A fourth new feature, called Flow Control Parameter Negotiation, lets users change the default size for data packets from the standard 128 bytes to some other value that ranges between 16 and 4K bytes.

Similarly, the feature gives users more flexibility in determining the packet window size or the number of packets that can be outstanding before an acknowledgment is required. With the feature, users can choose from a list of packet window sizes offered by each X.25 network provider. Typically, providers support

values between one and 128, as opposed to the standard default setting of two, which often results in wasted wide-area network bandwidth because the source node is forced to repeatedly wait for acknowledgments from the destination node.

The final new feature, dubbed Closed User Group, improves security for data traveling over public X.25 nets through the logical grouping of DTEs. That enables users to restrict incoming calls to, and outgoing calls from, predefined DTE groupings.

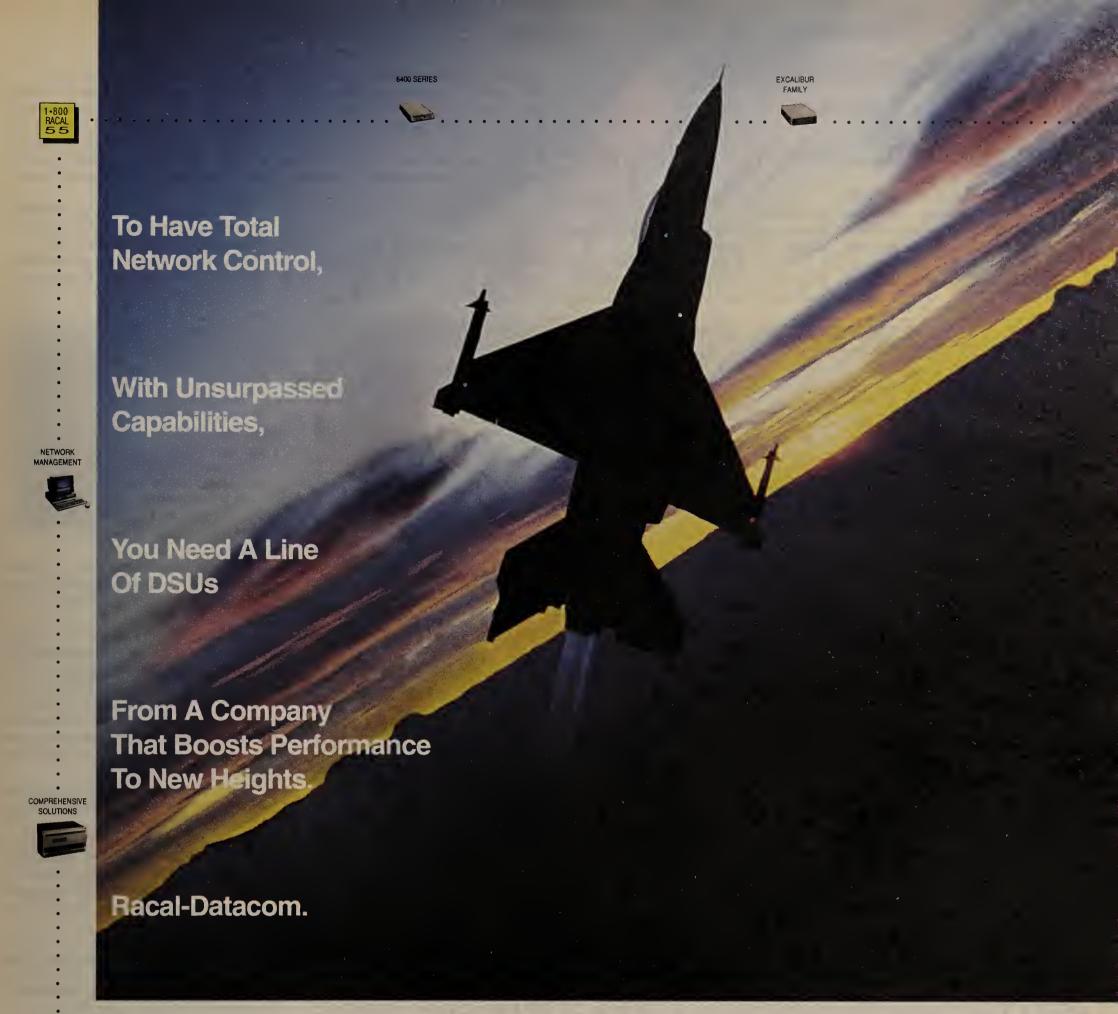
The X.25 enhancements will be available by year end as a free software upgrade with the release of Version 7.60 software.

©Wellfleet: (508) 670-8888.

Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.







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HEINTERNET

by Ed Krol

Commercializing the Internet

ommercialization and privatization are usually spoken of together by Internauts and frequently with disdain. But commercialization's bad image is undeserved. It is a positive force for the future of the Internet.

Unfortunately, privatization is a necessary prerequisite to commercialization. And privatization may be viewed as a double or nothing gamble on the Internet's future.

For most of the Internet's history, it has been subsidized by various government agencies, which have specified what constituted

valid use. These acceptable-use policies usually prevented blatant commercial uses. Although the federal subsidies were the catalyst for the Internet's rapid growth, the use policies also act as a cap on its continued growth.

Many people who fear commercialization point to Prodigy as the example of a commercial network gone bad because a portion of a Prodigy screen frequently contains advertise-

This may seem onerous, but it is unlikely something like this will happen to the Internet. Even in a commercial environment, there would still be little central control of the application software that displays this stuff.

If advertising does appear on the Internet, it will likely take the form of voluntary buying information, like a hypertext server of GM products, complete with pictures. If you were in the market for a car, you could voluntarily visit the server and browse through the sales

Many people who have grown dependent on the Internet are having trouble coming to grips with losing control of their destiny.

For years, the Internet has been a research-, education- and government- dominated network. But the cruel economic fact of life is that

these markets are really a small-potatoes business compared to the rest of the economy.

That's why commercialization is a positive growth factor. Try to go to a phone company and say you need a 56K bit/sec line into the high school in rural Minnesota, South Dakota or Utah. You



will usually get one of two answers - either they will do it for an unaffordable amount of money or they will flat out tell you it can't be done.

However, if you can get other people interested in data services — like perhaps the auto parts store, the tourist bureau or the local clinic suddenly there is more of a market and reason to build infrastructure. Once the market is established and the telephone facilities built, the politically correct usage, such as education and other social programs, can piggyback on that infrastructure.

The other way commercialization helps is by providing pressure to extend technology a little further a little faster.

Try to persuade stock brokers to use the Internet when their quotes may be delayed an arbitrary amount of time by someone at a university doing a file transfer. Or tell them someone may snoop at their E-mail. They'd tell you to take a hike.

Much of the engineering effort in the Internet today is aimed at finding solutions to these kinds of commercial problems, which, in turn, will help with noncommercial problems such as distance learning through videocasting.

In order for commercialization to happen, we need to get rid of the restrictions on use. To do that, we need to get the government out of the networking business and allow businesses that are not subject to government accounting rules to provide those services.

Privatizing the Internet is not as easy as it sounds. This is not like auctioning off a public corporation to a privately held firm." The Internet already is mostly private corporations in a loosely held consortium working for the public good.

The problem lies in finding a way to change the manner by which money flows from the government as a direct subsidy to a system that is funded by subscriber fees — without radically changing Internet culture. It is a truly perplexing problem that will deserve a whole column next month.

5.3 Mbps* wireless bridge offers cost effective alternative to T1/E1 telephone lines

Altair VistaPoint™. A high performance wireless bridge that links LANs over a distance up to 3940 ft. (1.2 km) in the U.S. (2.1 km outside of the U.S.). A fully equipped system can typically be delivered within a week and installed in a few hours. There are no recurring monthly charges for leased telephone facilities or months of delay waiting for a radio license.

With Altair VistaPoint, you can link LANs on different floors, in different buildings or separated by barriers such as highways, railroads, or rivers.

The Altair VistaPoint is also an ideal solution for emergency backup and disaster recovery because it eliminates the possibility of a severed cable crippling your network. With additional hardware, your primary wired







*The actual performance varies with protocols and packet sizes used in your network

Altair VistaPoint delivers secure and intereference-free communication over 18 GHz radio frequencies. Of course, the Altair VistaPoint is fully compliant with IEEE 802.3 and supports all your network operating systems and protocols.

link can automatically switch over to the Altair wireless

bridge to avoid loss of critical data when disaster occurs.

Based on Motorola's proven Altair® technology, the

Altair VistaPoint is quite simply the best way to make it seem like everybody's working under one roof.

Call us at 1-800-233-0877 or 708-538-4800 to discover why the best connection for your LANs may be the one you can't see.

(A) Motorola, Altair and Altair VistaPoint are trademarks of Motorola, Inc. ©1993 Motorola, Inc.

◆ Krol is author of The Whole Internet (O'Reilly & Associates, Sebastopol, Calif., 1992) and assistant director for LAN deployment at the University of Illinois at Urbana-Champaign. He can be reached at

e-krol@uiuc.edu.

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Before Boundary Routing Bank was being held



Next to armed

bandits, the thief bankers fear most is time.

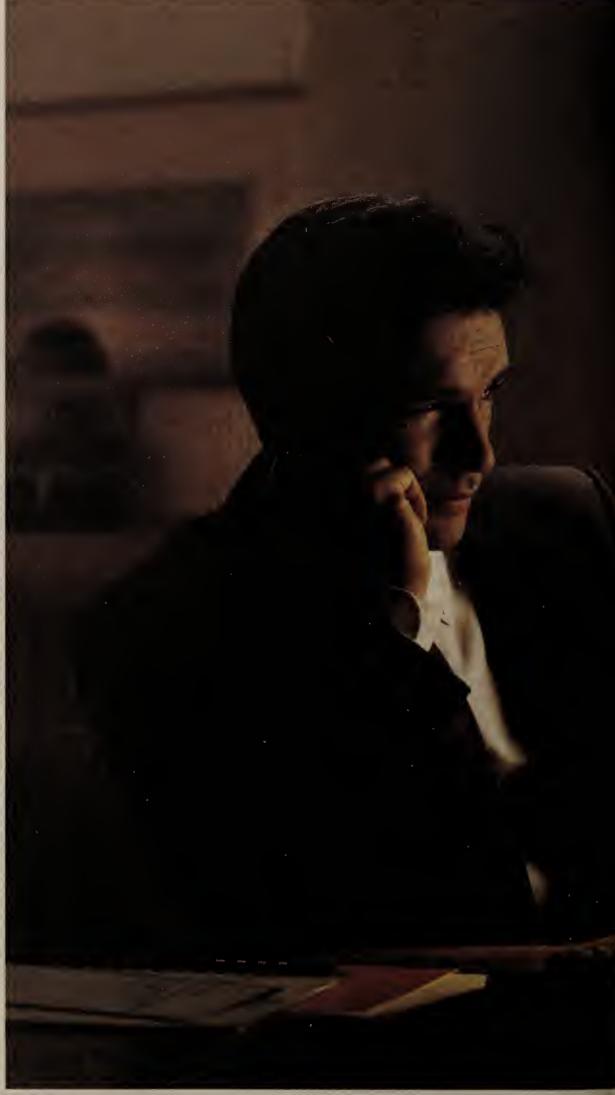
Lose a day here and a day there, when updating loan and mortgage information, and you just might lose a few customers, too.

For United New Mexico Bank, heading that problem off at the pass led to a unique and innovative remote office networking system from 3Com called Boundary Routing System Architecture. With 3Com's Boundary Routing technology installed, all of United New Mexico's 28 branches receive up-to-the-minute financial information. Without delay.

No technicians must visit the branches.

No new network staff must be added. One network administrator at the bank's headquarters can handle it all.

"Before extending our network to the branch offices, changing master loan and mortgage documents was very time-consuming," recalls Dan Langenwalter, Vice President of Technical Services for the bank. "It took two to five days just to revise the software applications. We had to route update diskettes



©1993 3Com Corporation. (408) 764-5000. 3Com, Networks That Go the Distance and Boundary Routing are trademarks of 3Com Corporation.

the United New Mexico up on a daily basis.



to each branch. And we had no control over what happened to the diskettes once they got there. Someone could slip them under a pile, and they could be lost for weeks."

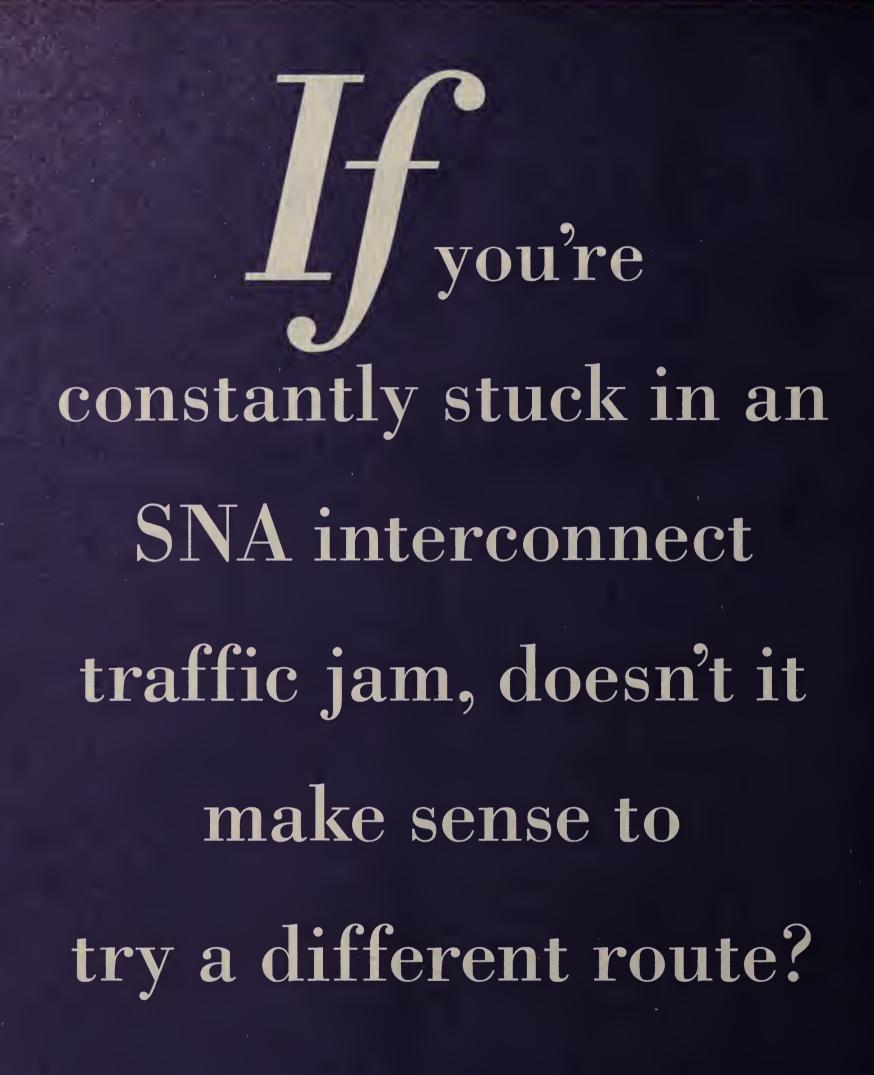
Now, Langenwalter proudly notes, changes to the network are made within minutes, from headquarters, where the experienced network administrators are. And administrative costs have been virtually eliminated at the bank's remote sites.

"The result," he says, "has been the best of both worlds: the benefits of routing without the complexity."

Bankers aren't the only ones who have discovered that 3Com's Boundary Routing technology is the simplest and most cost-effective way to add branch offices to the corporate network. For a free video, *Plug and Play Remote Networking*, along with complete product information, call **1-800-NET-3Com**. You'll find answers to remote office networking problems that have been holding you up, too.



Networks That Go the Distance™



In a networking world filled with gridlock, Proteon routers provide you with an open lane. Because when it comes to integrating SNA and non-SNA traffic across your network, only Proteon routers offer your applications the class of service, reliability and manageability they need to make true multi-protocol existence a reality. Here's why.

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LOCAL NETWORKS

Operating Systems, Management, Hubs, Adapters and Other Equipment

BRIEFS

Optical Data Systems, Inc. (ODS), a Dallasbased hub maker, this week will roll out an Intel Corp. 80486-based personal computer module for its Infinity intelligent hub line.

The 1094-486 module, available in one-, twoand four-slot versions, enables users to run PCbased applications and peripherals on their Infinity hubs.

The module supports disk drives from 80M to 500M bytes, as well as a Small Computer Software Interface connection for additional disk drives. The module features 4M bytes of randomaccess memory, a 1.4M-byte floppy drive and an AT keyboard port.

Optional Ethernet, token-ring and Fiber Distributed Data Interface adapter cards are also available for the module.

Available now, pricing for the 1094-486 module starts at \$6,000.

ODS: (214) 234-6400.

Pacer Software, Inc., based in La Jolla, Calif., this week will introduce Release 2.1 of its Pacer-Term terminal-emulation application for Apple Computer, Inc.'s Macintosh.

The new version displays incoming host data twice as fast as the earlier version, doubles the speed with which incoming host data is displayed, and supports asynchronous Transmission Control Protocol/Internet Protocol write operations and Telnet.

Release 2.1 is available as a free upgrade to 2.0 users. The software costs \$249 for new users.

Pacer: (619) 454-0565.

Nashua, N.H.-based Cameo Communications, Inc. this week will announce that Management Systems Group, a Long Island, N.Y.-based distributor, has agreed to resell Cameo's UltraHub family of products.

Cameo's product line includes the 5000 Intelligent Concentrator, 1000 Stackable Hub and 1030 Integrated Boundary Router Hub.

Cameo: (603) 888-8871.

Alta Research Corp., a network adapter card maker in Deerfield Beach, Fla., last week rolled out an Industry Standard Architecture (ISA)based Ethernet network interface card that supports Version 1.0 of the Plug and Play ISA specification developed by Intel Corp. and Microsoft

Plug and Play allows end users with minimal computer knowledge and no installation experience to install an adapter without setting jumpers or running special configuration software.

The Plug and Play software on the card determines what kind of personal computer it is plugged into, detects the hardware installed and automatically configures itself.

The new EtherGo cards, which are souped-up versions of Alta's EtherCombo 16 adapters, are based on a customized edition of National Semiconductor Corp.'s AT/Lantic Ethernet controller. Alta has not announced pricing for the EtherGo cards, which will be available in the first quarter of 1994.

Alta: (305) 428-8538.

National defense contractor ships peacetime security software

Hughes Aircraft Unix software supports SNMP Version 2.

BY CHRISTINE BURNS

Fullerton, Calif.

Security features of the SNMP Version 2 (SNMPv2)

specification

Defense contractor Hughes Aircraft Co. this week will uncover its first commercial software package, a Unix-based product for providing centralized security for local- and wide-area network data.

Hughes' NetLOCK software, which incorporates the security features of the Simple Network Management Protocol Version 2 (SNMPv2) standard, is designed to let network administrators build enterprise security strategies by defining how each workstation on a network can be accessed.

NetLOCK consists of both management station software and client workstation software. The management station software enables a net manager to distribute the client software, set security levels on each workstation and monitor the overall security system.

"There is a very significant segment of the Unix/legacy systems user community that has only dared to put [its collective] big toe in the open systems waters and not [its] whole foot because of a lack of networkwide security systems," said Katrina Pugh Leinbach, senior consultant at Aberdeen Group, Inc., a consultancy in Boston. NetLOCK not only provides for a secure net environment, but is easy to use, she added.

NetLOCK initially will be available next month on Unix-based Sun Microsystems, Inc. workstations. Sometime next year, Hughes will roll out NetLOCK on Novell, Inc.'s NetWare network

HP-UX and IBM's AIX, as well. John Garber, product-line manager for Hughes' Information Security Products Division, said all Net-LOCK products will interoperate so net managers will be able to administer security across a multivendor network from a single workstation.

operating system, and Hughes will consider

porting NetLOCK to Hewlett-Packard Co.'s

NetLOCK's management software sits on a designated workstation, where a network manager can install the client software across the network and control user

access levels. Down the road, Hughes may extend NetLOCK to run under enterprise SNMP management systems, such as SunConnect's SunNet Manager.

THREE SECURITY FEATURES

The management capabilities in NetLOCK are based on the three security features defined by SNMPv2: access control, authentication and encryption (see graphic, this page).

Access control and authentication go hand in hand. First, a network manager defines the access rights of all client workstations running the security software. Next, the authentication process kicks in when the network manager creates a private key for each client workstation and gives that client a security certificate that defines its access rights.

Whenever two end users want to exchange data over the network, NetLOCK initiates the private keys and then uses the net management station as an objective third party to authenticate whether the two workstations are allowed to communicate and whether the data they wish to exchange is secure.

Encryption is an optional level of security offered by the Net-LOCK software. When the network administrator initiates this level of security between two workstations, all transmissions between

them are placed in cryptographic envelopes.

Only the workstation at either end of the transmission can unravel the encrypted information. During the encryption and decryption process, NetLOCK executes error-checking procedures that ensure accurate transmission of the data. Encrypted packets are transmitted with nonsensitive address and routing information on the surface to enable the packets to flow freely over the network. NetLOCK for Sun workstations will cost \$3,995 for a 10-user license. Under an introductory offer, it will cost \$2,995 if purchased by year end. ©Hughes: (714) 732-1637.

"With the growth of

Madge token-ring hub card to ease remote management

BY SKIP MACASKILL

San Jose, Calif.

Madge Networks, Inc. this week will roll out a token-ring hub card for Novell, Inc. NetWare servers that will allow users to reduce the component count and ease local-area network management at remote

The Smart 16/4 AT Hubcard, which Madge developed in conjunction with Novell, is essentially a 10port intelligent token-ring hub on a network interface card. It leverages the server's processing power and NetWare functions to provide several features required by users in branch offices, such as remote management and easy installation.

networked branch offices, net managers need [products] in these remote sites that [do not] require the

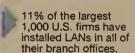
presence of a local administrator," said Martin Taylor, director of product marketing for Madge.

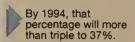
Hubcard features an AT bus connector that can be used in Extended Industry Standard Architecture (EISA)- or ISA-based servers over either unshielded or shielded twisted-pair wiring. Managers can link several Hubcards within a server to support LANs with 10 or more end nodes.

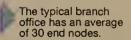
When used with NetWare server-based products, such as NetWare LANalyzer, NetWare for SAA and NetWare SNA Links gateways, and NetWare Multiprotocol Router (MPR), Hubcard can help users keep their remote LAN focus on a single server at each site, See Madge, page 20

Branching out with LANS

According to Forrester Research:









SOURCE: FORRESTER RESEARCH, INC., CAMBRIDGE, MASS. GRAPHIC BY TERRI MITCHELL

Radiance Communications to enter wireless LAN fray

Transceivers use infrared light to facilitate printer sharing.

BY CARYN GILLOOLY

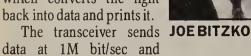
Santa Clara, Calif.

Start-up Radiance Communications, Inc. last week introduced a wireless local-area network device that uses infrared light to give personal computer users shared access to printers and other peripheral

Radiance's first product, LightShare-16, is a transceiver that connects to the parallel port of each PC or device in the network and will enable as many as 15

PCs to share peripherals in serverless environments.

The LightShare-16 transceiver converts data into infrared light, then beams that light into an open office space. The light bounces off walls and is received by an transceiver attached to a shared printer, which converts the light back into data and prints it.



requires no software at either the PC or the printer. Thanks to user-configurable group and individual identification numbers used by the system, up to eight LightShare groups — up to 120 users — can share the same office space without interfering with one

another.

The product costs about \$200 per node and is available now.

Robin Richardson, technology advisor for Business Logistics Services, a Memphis, Tenn.-based division of Federal Express Corp., said his company is running a beta test with LightShare-16 in a laboratory. But, he YOUNGSOORYU fully expects to roll the prod-



uct out across the company when the technology

"In the future, wireless communications will be the way to go," he said.

LightShare-16 is just the first step in a broader Radiance strategy to tackle the wireless communications market. The company is working with other firms to include its infrared technology in mobile and hand-held devices, such as personal digital assistants and even in home video games, said Joe Bitzko, director of marketing for Radiance, based here.

According to Youngsoo Ryu, Radiance's president, the company expects to have a PCMCIA interface by year end so that users will be able to plug LightShare-16 into portable computers.

© Radiance: (408) 980-5360.

Madge

Continued from page 19

Taylor said.

Essentially, the user is basing the LAN around the server, integrating all

"Essentially,

the user is

basing the LAN

around the

server,

integrating all

the required

access and

connectivity

capabilities

onto a single

platform."

the required access and connectivity capabilities - server, hub and bridge/router - onto a single plat-form," he explained.

Madge decided to work with Novell in this area since many

remote locations are NetWare environments, Taylor added.

Hubcard will ship with NetWare Hub Services, allowing net administrators to manage nodes attached to the card locally or from a central site via the Simple Network Management Protocol over Novell's Internetwork Packet Exchange (IPX).

Hubcard is compatible with Net-Ware Management System (NMS) 2.0 and Novell's Hub Management Inter-

Hubcard, which operates at either

4M or 16M bit/sec, can automatically locate and isolate a beaconing node on the token ring at the remote site and then send an alert to the NMS console sitting on the corporate LAN.

Available by year end, Hubcard will cost \$895, which is less than \$90 per

In conjunction with the Hubcard rollout, Madge also announced a Branch Office Strategy under which it will sell server-based hardware and software products for remote LANs.

The products will combine the functionality of multiple stand-alone devices, such as servers, hubs and bridge/routers.

Madge also will partner with Novell on joint marketing, sales and product

development programs.

In addition to Hubcard, the company offers two existing products for NetWare servers in branch offices: the Smart 16/4 Bridgenode adapter, which offers bridge/router functionality in conjunction with Novell's MPR; and the Smart 16/4 ISA Client Ringnode adapter, which is designed to link DOS and Windows workstations to

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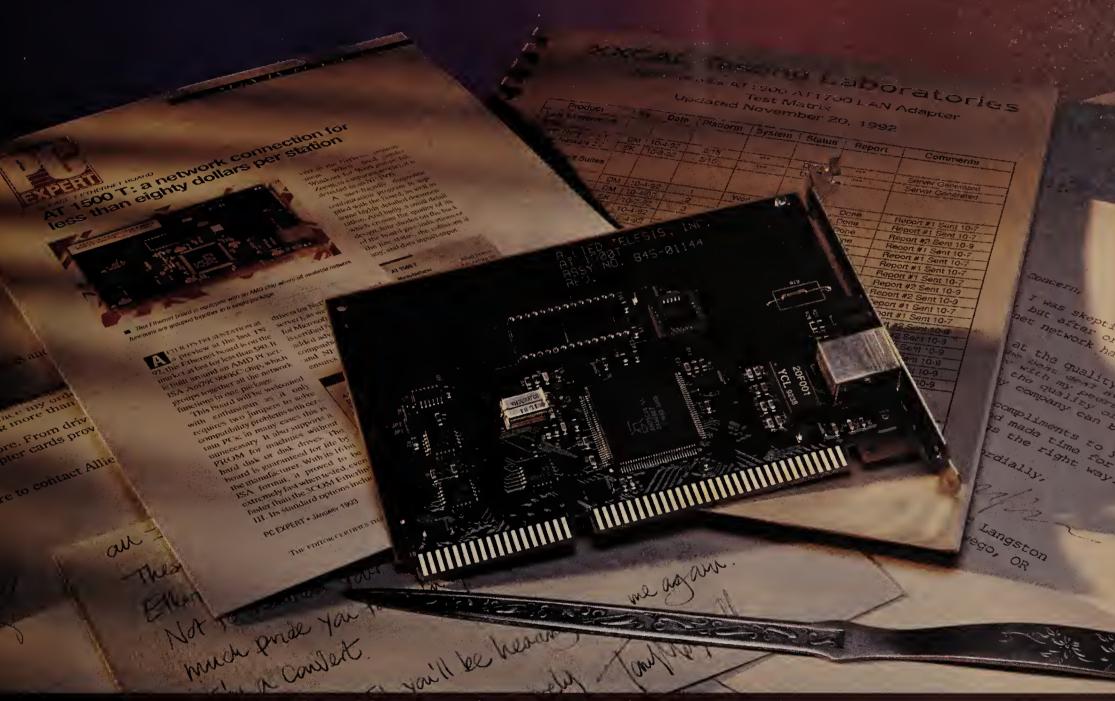
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NETRESULTS

by Mark Gibbs

Your LAN and the Internet

hat are you going to do about your LAN and the Internet? At first blush, you might think, not much. After all, the Internet is out there somewhere and it has nothing to do with your LAN. Or does it?

At present, the answer is no, unless you want it to. But in three or four years, not having an Internet connection will be as unthinkable as not having a telephone.

There has been a surge of interest in the Internet of late. It is becoming an icon for the government, which is pushing technology as a

cornerstone of its plan to revitalize the economy. The National Information Infrastructure has people excited, and rightly so, as it promises to give this country an unparalleled framework for communications.

The Internet also is starting to be seen by many companies as having real business potential. At one time, the Internet was strictly for education, research and the military, but this year, it was effectively commercialized.

Already, commercial systems account for more than 50% of the computers attached to

"Estimates of one billion net systems are

not crazy," said Vinton Cerf, president of the Internet Society and a coinventor of TCP/IP.

Among the organizations staking a claim to the Internet is retailer Nordstrom, Inc., which has secured a Class B Internet license that grants it 64,000 Internet addresses. And the company is not even using any of them - yet.

Large user organizations already tied into the Internet include Du Pont-Merck Pharmaceutical Co., J.P. Morgan & Company, Inc.,

Miller Brewing Co. and The Walt Disney Co. These aren't firms that do things because it seems like a good idea.

Let's get back to your LAN. What has the Internet got to do with it?

Your network is going to change in many ways. First, there will



be increasing pressure from your end users to communicate with existing Internet users via E-mail. Your users might already do this via CompuServe or Delphi information services, but think how much better would it be for them to have their LAN-based services integrated with the Internet's E-mail services.

If you're just going to stick with E-mail, you might get a corporate address (for example, mycompany.com) and connect to the Internet via a Unix-to-Unix Copy Program account or through CompuServe's messaging hub using Novell, Inc.'s NetWare Message Handling Service (MHS).

Once end users get a taste of the Internet with E-mail, they'll start to join lists, which work like bulletin boards, and access files through the E-mail-based file retrieval services. And the traffic volume will rise.

As your users hear about what can be done with full Internet access, you'll be pushed to provide a real connection. If you're a forward thinker, you might get dial-up access to the Internet through a service provider. Or if you're really thinking ahead, you might go for a dedicated 56K bit/sec or a T-1 line to the service provider.

Then you'll have to consider whether to bring the Internet directly to the desktop or just to an internal host that will allow access to it through virtual terminal services.

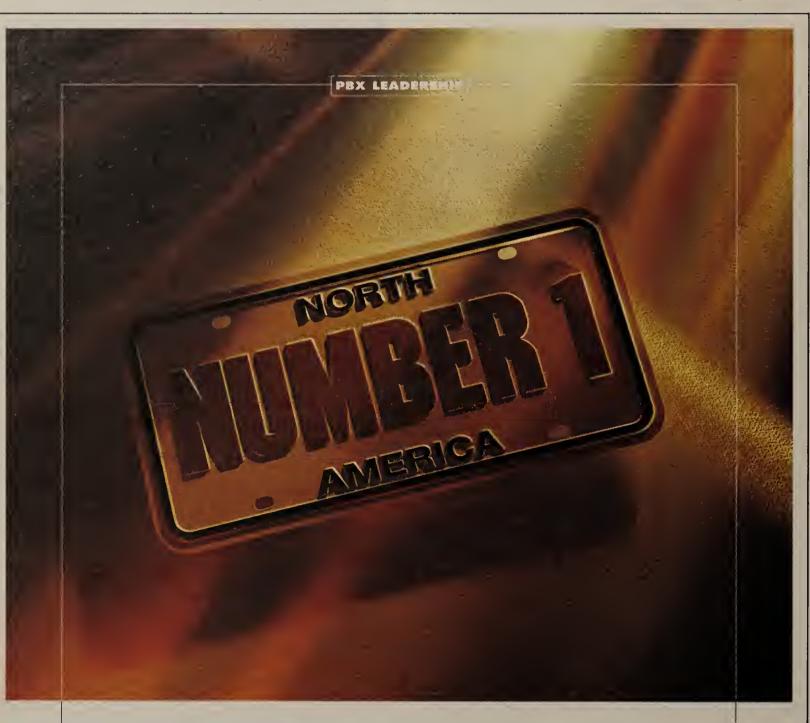
Whatever you do, you'll have to determine how much Internet access to give your end users. Will they be allowed to transfer files at will? If the Internet runs to the desktop, will you offer users access to Internet services? If so, how will you control security?

The biggest problem you'll face is how to control the whole mess. You will not be able to stop the Internet from becoming part of your net, and as the cost of TCP/IP software drops, you'll be hard-pressed to prevent various Internet services from appearing on your LAN. Then there is an emerging class of freeware and

users and test your net management skills. The Internet and what's on it are too valuable for your company not to be connected. You need to start thinking and learning about the Internet now — before you find that it is part of your life whether you like it or not.

shareware products that will further intrigue

Gibbs is a writer and consultant based in Ventura, Calif. He can be reached at (805) 647-2307 or via the Internet at mgibbs@rain.org.



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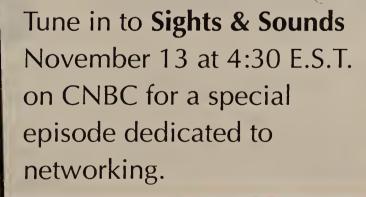


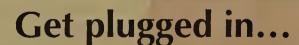


















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GLOBAL SERVICES

Voice, Data and Wireless Services, Regulatory Issues and Voice CPE

Figuring 'bursts' into the frame relay puzzle

With private lines, it was up to users to engineer each network connection,

and that labor brought with it an intimate knowledge of a network's inner workings.

But the arrival of virtual services, such as frame relay, has left some customers with only a vague understanding of what goes on inside a packet-switching cloud.

Unless users understand terms like "committed information rate" (CIR) and how excess capacity is allocated by carriers, they may not get the best deal when signing a frame relay service con-

As originally defined, CIR was the average sustained throughput on a permanent virtual circuit (PVC) in a frame relay net. With the rise of commercial services, CIR has come to mean the guaranteed transmission rate for each PVC, with a PVC being loosely analogous to a private line.

CIR is the minimum guaranteed bandwidth, which means that users can often send bursts of traffic that exceed their CIR. Most carriers will let users burst up to the capacity of their access pipe into the frame relay net-

work, which is why users would often be wise to configure those access pipes at high speeds.

> For example, a user may have a T-1 frame relay access pipe supporting PVCs with a CIR of 256K bit/sec each. While the user will always be guaranteed access to at least 256K bit/sec of band width on those PVCs, at certain times, the network would support bursts of data at

up to T-1, the speed of the access link.

Just how often a carrier will let you send such bursts of data depends on a number of factors.

For one, it depends on the capacity of the carrier's network and how many other users are competing for that capacity at the same time — if there aren't that many, chances are there will be spare network capacity for other users to burst above their CIR.

Typically, carrier services can handle spurts of traffic above the CIR for up to one second, although some carriers have implemented software that supports bursts of much longer periods (see story, page 31).

Users can lower their frame relay costs significantly by choosing lower

See Frame relay, page 31

Canada to begin major telecom regulatory review

Seeks to increase competition through regulatory streamlining.

BY ELLEN MESSMER

Canada's regulatory body, the Canadian Radiotelevision and Telecommunications Commission (CRTC), last week launched a broad review aimed at a complete overhaul of its current regulatory regime.

The CRTC, eager to change its monopoly-style regulatory policy into one more suited to encourage competition in telecommunications, began month-long public hearings on what steps it should take. While the outcome of the review is uncertain, users could potentially benefit from increased competition resulting in more services and lower rates.

Canadian authorities are now seriously consider-

ing proposals to lift the cable-telephone cross-ownership ban, unbundle local network services and lift requirements that force carriers to file tariffs for some services.

The winds of change are already thawing some frozen old regulations. Given new powers by the Canadian Parliament under the Telecommunications Act that took effect Oct. 26, the CRTC is now allowed to exercise "forbearance" - which in essence means it can decide not to regulate when it is judged to be in the public interest.

Immediately, the CRTC junked regulation that had forced resellers of telecommunications services to have their rates approved by the CRTC.

"We want to regulate only where it's justified,

when reliance on the marketplace does not provide consumer protection or meet public policy objectives," CRTC Chairman Keith Spicer said.

With its new power to forbear, the commission wants to stop regulating the sale of terminal equipment and indicated it wants to drop tariffing requirements for cellular services.

Just how far Canada should go in easing regulation was a topic of discussion at last week's CRTC hearing.

"We want open entry into all markets for all competition," said Carol Stephenson, group vice president of rates and regulatory matters at Stentor Com-munications, Inc. "We would open up our local network, and the cable companies would open their

networks, as well."

Stentor Communications, whose members include the six telephone companies providing both local and long-distance service in the Canadian provinces, was formed this year to develop national network services.

Canada opened up long-distance switched-voice service to competition a year ago, but much of the telecommunications market power in Canada is still in the hands of Stentor's members, which include Bell Canada and Newfoundland

Telephone.

STEPHENSON

With an air of unconcern, Stentor members maintain they are ready to implement equal access, which would give callers access to the long-distance provider See Canada, page 31

AT&T restructures rates for its Basic 800 service

BY BOB WALLACE

Basking Ridge, N.J.

Most users of AT&T's interstate and intrastate Basic 800 service will pay more for the service under a restructured pricing plan the carrier detailed last week.

The new interstate rates took effect last week, while the new intrastate rates are set to take effect by Dec. 15, pending approval from state regulators.

Introduced in 1967, Basic 800 service is designed for users with as many as 500 hours a month of toll-free calls. The service requires dedicated access and is used primarily at midsize locations.

The interstate version of Basic 800 was priced according to six mileage bands coupled with three different rate schedules that are based on the time of day,

New Basic 800 interstate rates

Off-Regional \$0.2467 \$0.1973

(less than 293 miles) National 0.2632 0.2105

(293 miles or more) SOURCE: FCC, WASHINGTON, D.C. GRAPHIC BY SUSAN J. CHAMPENY making it tough for users to determine service costs.

To simplify pricing, AT&T has reduced the number of mileage bands from six to two - regional and national.

The regional band covers what used to be mileage Band 1, while the national band covers the other GRAPHIC BY SUSAN J. CHAMPENY five former mileage bands (see graphics, this page).

just two rate schedules, one that covers calls made between 8 a.m. and 5 p.m., and a second for all other calls.

The rate changes are a mixed bag for Basic 800 users. Many will wind up paying

For example, those that paid 0.2405 cents a minute for calls from Band 1 will now pay 0.2467 cents under the new regional band, an increase of 2.5%. Users with calls from the former Bands 2 through 4 will also pay more under the national band, with increases ranging from just under 1% to nearly 6%.

AT&T revamps Basic 800 service rates Old interstate rates

Mileage band	Day	Evening	Night/ weekend
Band 1: 0-292	\$0.2405	\$0.1983	\$0.1594
Band 2: 293-430	0.2487	0.2050	0.1650
Band 3: 431-925	0.2528	0.2080	0.1667
Band 4: 926-1,910	0.2610	0.2148	0.1730
Band 5: 1,911-3,000	0.2652	0.2182	0.1757
Band 6: 3,000+	0.2895	0.2385	0.1918

On the bright side, companies that Additionally, AT&T has implemented received calls from Bands 5 and 6 will pay less under the national band. For example, users that paid 0.2895 cents a minute for calls from more than 3,000 miles away will now pay 0.2632 cents, a decrease of about

> AT&T also raised rates for users of intrastate service in an effort to establish a single consistent rate for Basic 800 service in all

> In addition, AT&T asked state regulators to boost rates for the service in 19 states, from 2% for Nevada to 16% for North Dakota. But there will be no change of Basic 800 rates in 20 states. **∠**

BRIEFS

Last week, Rep. Edward Markey (D-Mass.) introduced The Telephone Consumer Privacy Act of 1993, which would prohibit telephone companies from disclosing or selling customer name, address and calling pattern data to anyone without the customer's consent.

The bill also establishes privacy standards for caller identification on a national level and requires businesses that use automatic number identification to inform their customers of their intent to reuse or resell information gleaned from ANI services.

MFS Communications Company, Inc. last week acquired bypass networks in Rochester, Albany and Buffalo, N.Y., through the acquisition of FiberNet, Inc., an alternative access service provider.

The acquisition is subject to regulatory approval from federal units and the New York State Public Service Commission.

According to MFS Communications, it expects to receive the approvals for the acquisition early next year, at which time the company will take over control of the three New York networks.

TRAPPED IN THE BODY OF THIS TINY SE

This is a story about a small computer engineered to be so dependable, you won't think twice about trusting it with your mission-critical applications. And to be this without filling a closet,

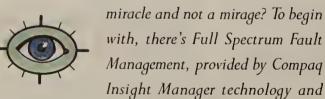
much less a room. If you haven't thought of Compaq as an enterprisecritical platform before, we invite you to grab your bifocals and

begin. (We'll be cramming a lot of information into this ad, which, given how much we managed to fit into our new servers, only makes sense.)

If there's one thing we've learned working with our customers, it's that you're running more and more mission-critical applications on your network. And if your network goes down, your business goes down. All of which makes the introduction of the new Compaq ProLiant Server even more timely.

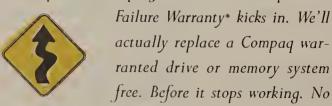
The ProLiant is a new family of affordable, high-performance, easy-to-manage servers engineered specifically to provide the high availability you need for mission-critical networks. We've designed ProLiant in three different models, ranging from a single-processor configuration to a four-Pentium processor model.

Now, how can you be sure our server is truly a



software that continually monitors over 800 aspects of the server's operating status. (For example, Drive Parameter Tracking checks 15 hard-drive parameters.) All of this information is constantly gathered, analyzed and then used to prevent, tolerate or recover from system problems.

If the performance of a monitored component drops below a specified level, our unique Pre-



downtime. Ringing cash registers. Happy boss.

Still, no network's perfect. In the unlikely event problems occur, our server exhibits remarkable tolerance. Every ProLiant includes Compaqdesigned hot-pluggable drives. ProLiant Models 2000 and 4000 come standard with advanced error-correcting memory and off-line backup processor features (whereby the server reboots

automatically to a second processor). And, most notably, the Compaq Smart SCSI Array Controller together with the ProLiant Storage System ensures mission-critical data integrity. Should a network problem bring the server down, the Rapid Recovery Systems of the ProLiant are designed to bring it back up.

VER IS A MAINFRAME WITH AN ATTITUDE.



For example, Automatic Server Recovery 2 uses a historical record of server status and performance to perform an astonishing array of tasks. Like intelligently restarting the server, automatically correcting a variety of problems, and accessing a telephone pager to contact network administrators.

By now you'd expect us to have rethought server setup, configuration and OS installation, but you might be surprised by the results. Introducing SmartStart, a CD-ROM system that takes the headache out of getting your server up and running. ProLiant includes a CD-ROM drive and bundled CDs of optimized

Netware and other major operating systems. To get hooked up to your network operating system, simply call your dealer for an access code, enter it, answer a few questions, and leave. Minutes later—say, after you've enjoyed a cup of coffee and a jelly donut—you'll return to find an integrated OS fully installed and optimized for increased performance and improved management. And we'll keep you updated via

CD when new operating system versions appear.

And finally, to accompany our new line of mission-critical servers, we're introducing mission-critical support. With ProLiant, we now offer extensive analysis, installation and service through our CompaqCare System Partners, a select group of highly trained systems experts backed by Compaq engineers. You can now choose 4-hour on-site warranty response upgrade** direct from Compaq. Again, there's our unique Pre-Failure Warranty. And, of course, all Compaq servers come with a 3-year on-site† warranty, and 7-day-a-week, 24-hour-a-day technical support.

All in a surprisingly small box for not a whole lot of money. In fact, a DX2/66 Compaq ProLiant 1000 starts at about $\$6000^{\ddagger}$.

Which may help to explain the look your boss gives you when he hears how much money you've saved: stunned admiration. But you'll get used to that. It goes with the territory. For more information on the new Compaq ProLiant servers, or for the location of an authorized Compagnesseller near you

Compaq ProLiant servers, or for the location of an authorized Compaq reseller near you, just call us at 1-800-345-1518. If you'd like to receive model, feature and specification information immediately via fax, select the PaqFax option. Or, if you'd like that information even sooner, just turn the page.





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ProLiant 2000

ProLiant 4000

ProLiant 1000

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	Pentium 66MHz	Pentium 66MHz		
TriFlex/PC One Processor	TriFlex with up to two symmetric processors	TriFlex with up to four symmetric processors		
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Departmental network services—primarily NetWare	Departmental network application services— NetWare, NT and Unix	Application services for preemptive downsizing— NT and Unix		
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Second-generation Compaq Insight Manager (standard) combines with innovative hardware design to constantly monitor, assess and report server health and performance				
Insight Manager alerts you to server status changes in over 800 component parameters, allowing proactive server management backed by 3-Year Pre-Failure Warranty				
Standard support for RAID levels 1,4,5; hot-pluggable drives; on-line spare drive; off-line backup processor§; advanced ECC RAM§				
Standard rapid recovery services automatically return server to full operational status even in the event of a critical subsystem failure				
	Up to 12 High-Speed Charles Integrated Fast SCSI- 550MB—112GB Internal/external Departmental network services—primarily NetWare 50—150 TPS \$6,000 ER DEPENDABILITY Second-generation Compaq Indesign to constantly monitor, Insight Manager alerts you to allowing proactive server many Standard support for RAID leads off-line backup processors; and Standard rapid recovery service even in the event of a critical server.	Up to 12 High-Speed Channels; NetFlex 2 with Packet Bl Integrated Fast SCSI-2 and Smart SCSI Array Contro 550MB—112GB Internal/external Departmental network services—primarily NetWare NetWare NetWare, NT and Unix 50—150 TPS \$6,000 ER DEPENDABILITY AND AVAILABILITY Second-generation Compaq Insight Manager (standard) comb design to constantly monitor, assess and report server health a losight Manager alerts you to server status changes in over 80 allowing proactive server management backed by 3-Year Presentations of the processor of the pro		

SIMPLICITY, EASE OF OWNERSHIP AND SUPPORT		
SmartStart	Standard CD-based intelligent hardware configuration and system software installation, providing simplified server configuration for NetWare, NT or Unix. (CD-ROM drive standard)	
System Warranty	Free Three-Year, On-Site Limited Warranty	
Pre-Failure Warranty	Three-Year, On-Site Warranty replacement of designated components that fall below preestablished thresholds	
4-Hour Warranty Response Upgrade	Optional Three-Year On-Site Warranty upgrade to 4-hour response	
Technical Support	Toll-free, 7 x 24 technical phone support from Compaq engineers	
CompaqCare System Partners	Highly trained, dedicated, third-party professionals who provide systems maintenance and comprehensive technical support	
QuickFind/PaqFax	Proactive notification and delivery of new technical information/7 x 24 fax response for updated specification, configuration and settings data	



Canada

Continued from page 27

of choice, and to permit collocation of network equipment in central offices for the benefit of alternative local service providers.

Stentor is asking the CRTC to treat the telephone company services as two separate units — one for noncompetitive services, such as local-access, and the second for competitive services, such as frame relay and X.25. The noncompetitive category would continue to be tariffed, but the competitive services would not; cross-subsidy between the two would be prohibited.

But Toronto-based service provider Unitel argued that de-regulating Stentor, which has 95% of the residential market and at least 75% of the business market, would be preliminary at this point. "The major change we urge the commission to institute is the introduction of a price caps regime," said George Harvey, chairman of the board at Unitel.

Unitel is not pushing for a breakup of local and long-distance sides of the Stentor companies, something that occurred in the AT&T breakup 10 years ago. Instead, Unitel wants the Canadian phone companies to unbundle network services so competitors — such as information service providers — can have the same access to the various elements that make up local services as Stentor members give themselves. Those elements include access to signaling networks, billing data and net management functions.

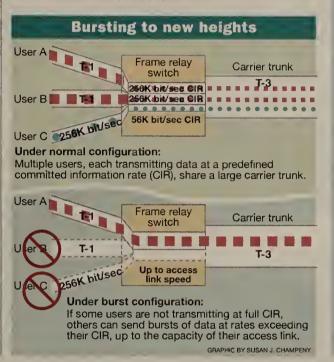
While it's uncertain what the outcome for users will be, one change is certain to bring benefits. Just as the U.S. was able to carry out 800 portability last May, so will Canada this January, an event that will allow Canadian users to switch carriers without having to

Frame relay

Continued from page 27

CIRs for applications that may not be mission-critical, knowing they will be able to burst above that CIR occasionally. Also, users can often count on bursting above the CIR at certain times of the day, such as at night when the carrier's net is not so busy. Users can take advantage of those periods to conduct large file transfers, for example.

One shortcoming of frame relay is its lack of a surefire way to provide flow control. However, frame relay users typically have some implicit flow control, thanks to higher level protocols, which require acknowledgments that data is received before additional information can be sent.



Switch vendors support data bursts via different methods

The two switches most widely used by carriers to provide frame relay services - StrataCom, Inc.'s IPX and Alcatel Data Networks, Inc.'s TPF — use different schemes to let users send bursts of data above their committed information rate (CIR).

StrataCom's IPX is used by such carriers as AT&T, CompuServe, Inc., BT North America, Inc. and WilTel, while Sprint Corp. uses Alcatel's TPF.

While Sprint has designed its frame relay network with enough capacity to allow the bulk of its users to rely on bursting above CIR to support most transmission requirements, other carriers depend on the net management capabilities of the IPX to help them tailor services to different users.

Sprint has set up its network to let customers frequently send bursts of data at the full speed of their access link, even if they have a CIR that runs slower than that rate.

Sprint's service categories run from a CIR of 0 up to 1.024M bit/sec, and the net can always handle bursts of up to one second. Surprisingly,

almost 90% of Sprint's customers use the 0 CIR service, which does not guarantee access to net bandwidth but lets users frequently transmit data at rates up to 1.024M

StrataCom relies on its ForeSight software to manage network capac-

The ForeSight software allows carriers to dole out spare bandwidth as available, which helps carriers tailor services to meet varying user requirements. For example, Systems Network Architecture users might want a steady 32K bit/sec and not value bursting as highly as others might.

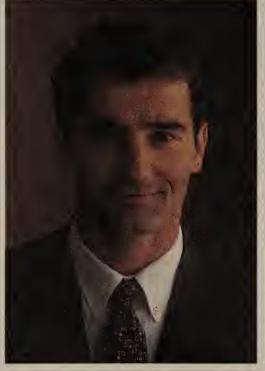
Carriers using the StrataCom switch have been able to let users burst above CIR for extended periods of time.

For example, LSI Logic Corp. in Milpitas, Calif., originally signed up for a 256K bit/secCIR with AT&T but was able to drop back to a 126K bit/sec CIR when it found it could burst above that for extended periods, typically during evening hours (NW, Oct. 11, page 1).

BY BILL BURCH









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RATE & TARIFF MONITOR

by David Rohde

Your T32 price: A needle in a haystack



T&T has introduced the industry's first 32M bit/sec private-line service. It's a good deal if you need the equivalent of more than

10 T-1 lines between two specific cities. Now try to find the price for your city pair.

Hint: It's hidden in a mass of codes within a 2-in.-thick tariff.

Like most high-capacity services, this new offering — Accunet T32 — is mileage-sensitive. But you can't determine the price for a T32 interoffice channel by the usual method of looking up coordinates of the two AT&T central offices involved, calculating the mileage between them, then finding the price for the corresponding mileage band.

Instead, AT&T has issued 246 pages of specific prices for individual city pairs. It takes that many pages because Accunet T32 is available in 273 AT&T points of presence (POP), and there's a separate price for each POP to each other POP! These pages were just added

to AT&T's Tariff FCC #9, the tariff that covers AT&T private-line interoffice channels.

Say you want to calculate the price of a T32 between Chicago and Minneapolis. You won't find the name of either city in the new section of FCC #9. Instead, you must know the "Common Language Location Identifier" codes of the AT&T POPs in both cities that support Accunet T32. These eight-character codes are called "CLLI codes" (pronounced silly codes).

But to identify the CLLI codes, you must go to AT&T's FCC #10, which covers central office information.

Careful now there are 15 AT&T POPs in the Chicago LATA, but only two support Accunet T32. In Section 358 of Tariff FCC #10 -



matching the Chicago LATA, Number 358 — you'll find the first Chicago POP that lists Accunet T32 as a supported service. It carries the CLLI code "CLCGILCG." In Section 628 of FCC #10 matching the Minneapolis LATA Number 628 you'll find only one Minneapolis POP sup-

porting Accunet T32. It carries the CLLI code

''MPLSMNDT.'' Now go back to FCC #9. But first adjust your thinking: The information is not in LATA

order, as in FCC #10 but, it's in alphabetical order of the CLLI codes.

To find the combination of the two CLLI codes — CLCGILCG to MPLSMNDT — go to page 55 of the 246-page Accunet T32 price list. Read across to find the monthly interoffice channel charge: \$28,115.40. Plus, for any circuit, there's a multiplexing charge to split the line into 21 T-1 equivalents (\$950 per month plus a onetime installation fee of \$533).

This pricing scheme may be cumbersome, but it does highlight an interesting point. Any new service where availability is limited to certain POPs tends to put the spotlight on access costs. That's because the POPs supporting the new service are likely to be downtown locations. Any user attempting to connect to an AT&T POP for T32 service that is not in or near downtown will see access costs climb dramatically, since high-capacity access costs tend to be very mileage-sensitive.

Fortunately, AT&T is reducing its T-1 access costs by about 11%. And some new T32 users — those that are switching from Accunet T-3 or fractional T-3 — won't face this problem because the 273 POPs that support T32 are the exact ones that support T-3 services.

Believe it or not, there's one case where AT&T has actually made tariff analysis easy for Accunet T32. That's if you want to put a circuit between two cities in the same state.

Ordinarily, to price such a circuit, you'd have to reference yet another tariff -AT&T'sintrastate tariff filed with a state public utility commission. But in this case, intrastate city pairs are covered right in FCC #9. For example, a T32 line from Philadelphia to Pittsburgh -CLLI code "PHLAPASL" to CLLI code "PITBPADG" — costs \$24,325.35 per month.

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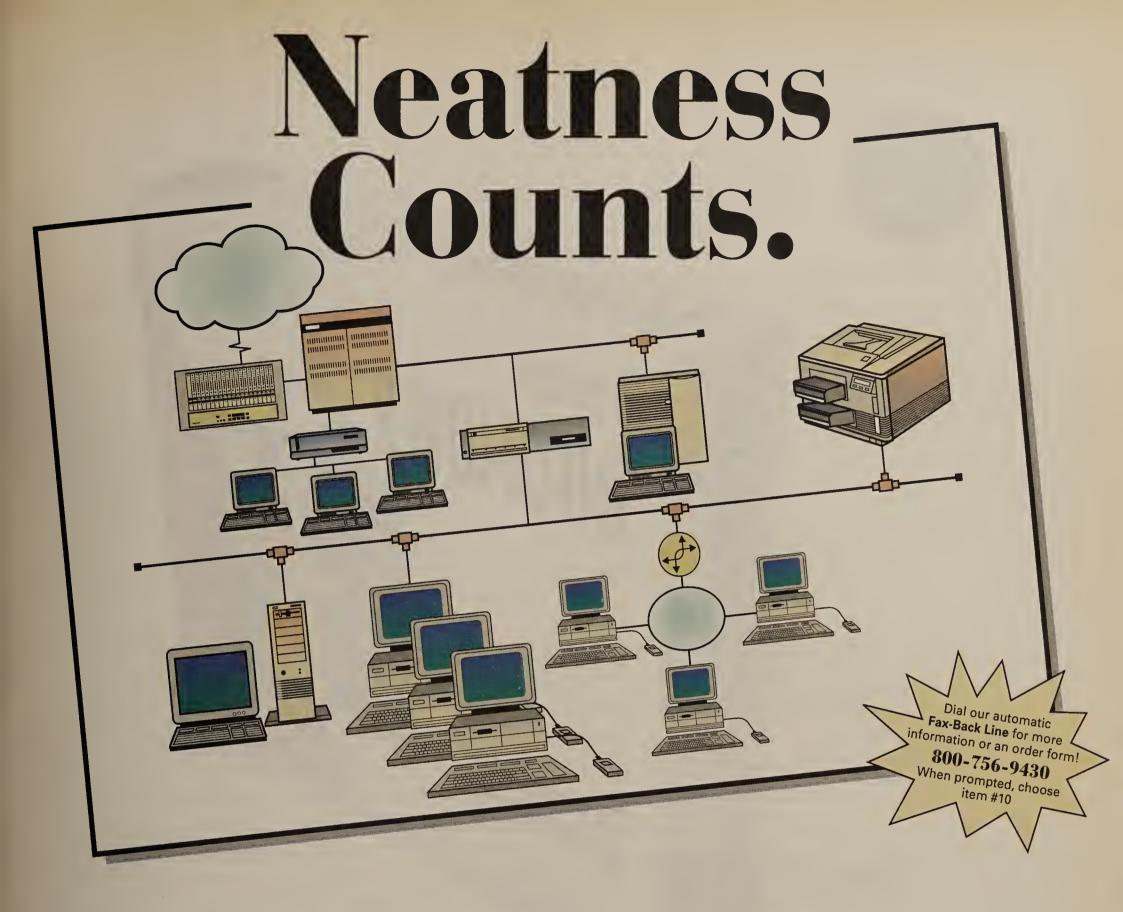
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International Fax (612) 331-3180, Technical Support (800) 972-2439, BBS (612) 785-9875 or (800) 392-2432

Rohde is associate publisher of the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff

information. He can be reached at (301) 816-8950,

Ext. 292.



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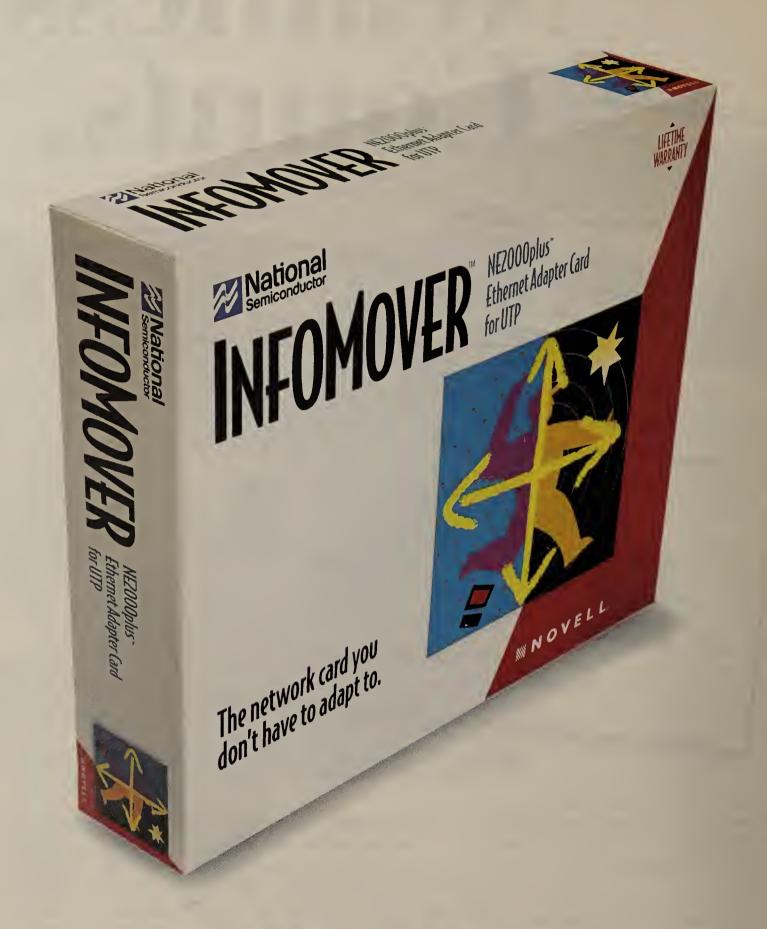
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NETWORK WORLD



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Infodisk, MicroData Infodisk, and DataWorld Infodisk CD-ROM products.

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NETWORK COMMUNICATIONS CORPORATION INTERNetwork Probe Demo. A PC-based WAN testing partner for the LANalyzer 4x Network Analyzer by NCC. Requires a VGA monitor. Call 1-800-333-1896 for more information.

NETWORK DIMENSIONS

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2. GrafBASE Demo. A graphical database for managing and presenting LAN and MAN configurations.

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trols applications and operating systems.

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CLIENT/SERVER APPLICATIONS

Distributed Databases, Messaging, Groupware, Imaging and Multimedia

Sun unveils application sharing, videoconferencing software

Groupware to support audio, shared whiteboard, as well.

BY WAYNE ECKERSON

Mountain View, Calif.

SunSolutions' ShowMe 2.0 allows

remote users to conduct face-to-face

Sun Microsystems, Inc.'s groupware subsidiary will soon ship desktop videoconferencing software for Unix workstations that allows users to conduct face-to-face meetings while sharing documents and applications.

SunSolutions, Inc.'s ShowMe 2.0 software expands on the shared whiteboard

capabilities of Version 1.0 by adding audio- and videoconferencing modules as well as a shared application module that lets users view and edit applications simultaneously.

software same file or application. The operates on Sun

SPARCstation workstations running Solaris 1.0 or 2.0, and will soon be available for Hewlett-Packard Co.'s HP-UX, IBM's AIX and Solaris for Intel Corp.'s X86 platforms.

ShowMe's audio and video modules require users to install a SunSolutions video camera and microphone. A SunSolutions video card is required to transmit video but

is not needed to receive video transmissions.

ShowMe 2.0's application sharing utility called SharedApp — was developed in conjunction with Sandia National Laboratories in Albuquerque, N.M., which does research for the U.S. Department of Energy. Sandia developed the core technology for ShowMe SharedApp in the early 1990s to allow research scientists in disparate regions to collaborate via a network.

The SharedApp module lets multiple users view and edit the same application across a Transmission Control Protocol/Internet Protocol network. allows, for example, meetings while viewing and editing the engineers in different locations to review a computer-

aided design file and capture all edits made to the file for reference purposes. It also allows an instructor to demonstrate how to use a new application to remote users, who could then test-drive the application while the instructor watches their cursor movements and edits on a computer screen.

The SharedApp module supports any

application based on the X Window System Version 11 standard that runs on a Sun SPARCstation. The Shared-App utility also allows users to share Windows applications that work under SunSelect's Wabi software,

which lets Windows applications run on Solaris unchanged.

SharedApp is designed to complement ShowMe's audio- and videoconferencing capabilities, allowing users to see and talk with each other as they work on joint tasks.

To minimize net bandwidth, users can adjust the frames-per-second transmission speed of videoconferencing sessions. They can also decrease the size of the videoconferencing window and conduct multicasts, or one-way video and audio transmissions.

ShowMe 2.0 also contains an enhanced whiteboard utility that now supports 24-bit images, making it possible to display highquality graphics.

In addition, each user in a whiteboard session is given a different colored cursor, making it easy to determine which participant is annotating a document or marking the whiteboard.

Available in December, ShowMe 2.0 will cost \$3,270 for a single-user license and \$8,430 for a three-user license. A video camera and board will be included with each license. A version without video capabilities will cost \$899 for a single-user license, \$1,650 for a three-user license and \$3,750 for a 10-user license.

©SunSolutions: (415) 336-4567.

nett's infoWare Notes-based service submits product information 14.4K bit/sec Acrobat conversion software nett Information Products, Inc.'s nett infoWare on-line service uses Lotus Development Corp.'s Notes to maintain a database of vendor product information accessible to users and resellers via 14.4K bit/sec dial-up lines. GRAPHIC BY SUSAN J. CHAMPENY

Start-up launches **Notes-based** information service

BY PETER LISKER

Los Angeles

For users, resellers and even vendors, keeping track of network product marketing and technical information is often a daunting task.

But a new on-line service from Los Angeles startup nett Information Products, Inc. is designed to make accessing, organizing and using this information simple and consistent.

The start-up's nett infoWare offering is a subscription-based dial-up Lotus Development Corp. Notes database service that initially contains all the product information one could ever want from network vendors Novell, Inc. and 3Com Corp. The firm is actively engaged in signing on more vendors to make their product marketing and technical data accessible via the service, as well.

"When I was talking to resellers and large corporate network users, I found that there was a need for a service that allowed access to all the information a vendor might have about their products, not just the standard marketing literature," said Fadi Chehade, president and cofounder of nett. "I saw a market opportunity for providing vendors with a unified place that potential customers could go to for all the information about a company."

One goal of nett infoWare is to give vendors a facility for organizing and evaluating what information exists in order to consolidate it on a single platform.

The nett info Ware service is anchored by a central Notes database, which users and resellers can access via 14.4K bit/sec dial-up lines. Adobe Systems, Inc.'s Acrobat software also runs at the nett infoWare hub site to maintain the graphics, formatting and fonts of the vendors' original documents.

The company has designed a custom front-end interface to Notes that runs on Windows personal computers at the user site and allows users of the service to navigate through reams of information stored in the central database. Information pulled from the central database can be stored in a local Notes database at the user site.

The service is designed to eliminate the need for users and resellers to collect vendor product informa-See Notes, page 38

BRIEFS

InSoft, Inc. recently announced a shared application capability for Communique, its multiplatform, desktop videoconferencing software. Called InSoft Shared Applica-Resource **Environment** (SHARE), the software allows multiple users to view and edit a document or application in real time across a network. The InSoft SHARE software will be available on Sun Microsystems, Inc. workstations running SunOS 4.1 in December. Versions running on Hewlett-Packard Co.'s Apollo Series 700, IBM's Risc System/6000, and Silicon Graphics, Inc.'s Indigo and Indy workstations will ship in the first quarter of 1994.

InSoft: (717) 730-9501.

Starlight Networks, Inc. last week announced that it has acquired exclusive distribution rights to ProtoComm Corp.'s VideoComm video networking product. VideoComm, renamed Star Ware, is a video application server for Novell, Inc. Net-

Ware. StarWare will complement Starlight's own StarWorks video server that runs on Unix platforms.

In addition, Starlight announced a starter kit for building networked multimedia applications. Called Starter Suite, the kit contains tools from multiple vendors required to create, edit and distribute multimedia applications across networks of Macintosh and Windows personal computers. The kit is available now for an introductory price of \$4,995.

Starlight: (415) 967-2774.

WordPerfect Corp. and MCI Communications Corp. have entered into a joint development and marketing alliance to integrate WordPerfect Office 4.0 with MCI Mail. Under the agreement, MCI will embed WordPerfect Office post offices into the MCI Mail public Email network. The integrated services will be available in the second quarter of 1994.

WordPerfect: (801) 225-5000; MCI: (914) 934-6480.

Visioneer offers scanner, software combo

BY WAYNE ECKERSON

Palo Alto, Calif.

Simplicity and ease of use are the guiding principles behind a new desktop document management and communications product from Silicon Valley start-up Visioneer.

Visioneer's offerings consist of a small, lightweight scanner dubbed PaperMax and desktop software called MaxMate that together turn paper documents into electronic files that can be manipulated, annotated and distributed via facsimile and electronic

PaperMax and MaxMate work with Windows and Apple Computer, Inc. Macintosh computers, and are designed to be installed and used by the average personal computer user. The products, which come bundled, will cost \$499 per user.

Visioneer's hardware/software offering provides an inexpensive way for users to move paper off the desktop and into an electronic form, said Shelley Harrison, Visioneer's director of marketing. Once the paper is converted into an electronic form, the document can be collated with others and either stored or

See Visioneer, page 38

Notes

Continued from page 37

tion from too many different data sources, such as facsimiles, electronic mail and regular mail. The service also solves the problem of determining which version of the information is the most current since vendors are responsible for providing nett infoWare with the information needed to update its central database.

While the allure of nett infoWare is clear, the market reality is that nett will need to sign up more vendors before the service will take off. It is a classic chicken-and-egg dilemma in which vendors may be leery about joining the service until more users and resellers sign on, and vice versa.

User subscriptions are available for five to 250 users. A 10-user subscription for accessing information from a large vendor, such as Novell, costs \$850.

Multivendor subscription packages are also available.

The vendor fee ranges from \$8,000 to \$25,000 for placing information in the nett infoWare database.

Onett: (310) 836-5225.

Visioneer

Continued from page 37

distributed to other users in a work group environment, she added.

Some possible uses include disseminating newspaper clippings to an E-mail distribution list; electronically storing purchase requests, purchase orders and receipts in a single place for quick reference; and distributing to loan officers the documents required to evaluate a loan, including application forms, bank statements and credit histories.

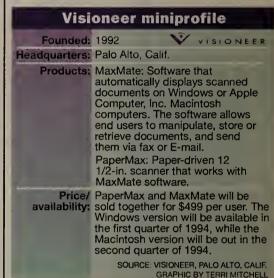
Paper Max is a 12 1/2-in.-long, 3-in.-wide scanner that weighs 2.5 pounds and fits between most computer keyboards and monitors. Its unique design returns paper feeds back to users in a loopback fashion, and it automatically straightens out documents fed into the scanner crookedly.

Paper Max activates whenever a user places a slip of paper into it. The product scans the sheet in less than six seconds and automatically launches the MaxMate software residing on the PC, where the scanned image is then displayed.

MaxMate enables users to rotate, highlight or magnify the image, as well as combine it with other images to create a file.

The software also allows users to annotate images with text, fill out a form or index the image based on key words. Users can also combine one or more images with word processing and spreadsheet files.

MaxMate also combines third-party E-mail and fax capabilities. Users can click on one or more images and drag and drop them on an E-mail or fax icon on the MaxMate desktop. This automatically appends the image to the electronic message or fax file.



Initially, MaxMate will work with Lotus Development Corp.'s cc:Mail, Lotus Notes, Microsoft Corp.'s Microsoft Mail and Da Vinci Systems Corp.'s eMail software, as well as popular third-party fax software packages. MaxMate also will support third-party optical character recognition tools.

To ease the transfer of large image files across a network, MaxMate has a special compression algorithm that reduces most files to less than 40K bytes per page of text.

MaxMate also includes free viewer software for Windows, DOS and Macintosh computers so multiple users on a network can view images — in a proprietary format — generated by MaxMate. This software will also be available free of charge via CompuServe and America On-line public bulletin boards.

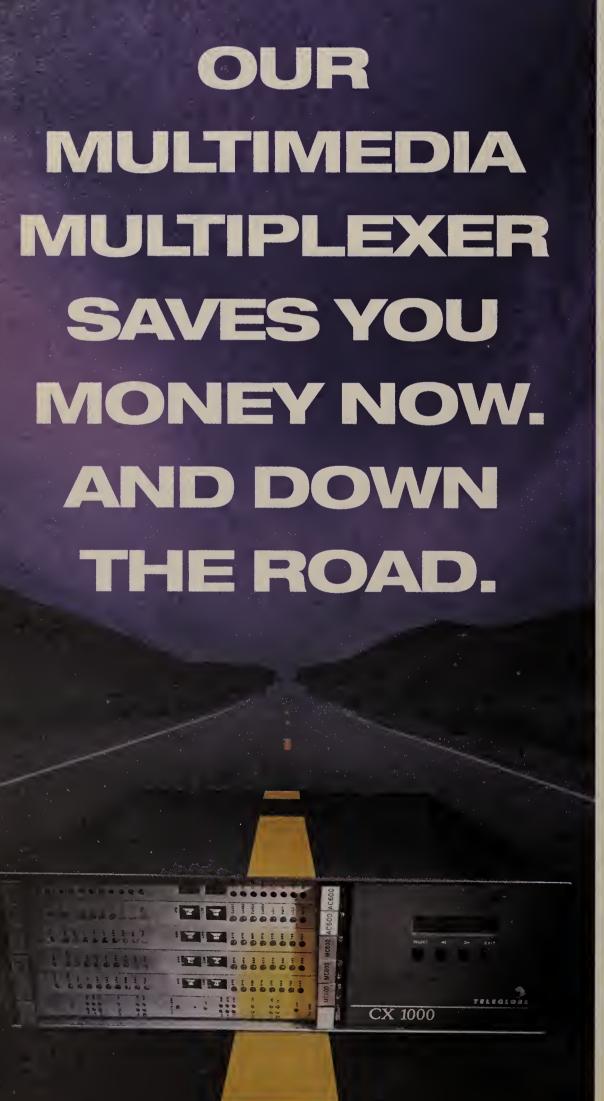
MaxMate image files also can be converted into other file formats, including BMP, PICT, PCX and TIFF, for use in other applications. Also, BMP, PCX and TIFF files can be converted and imported to MaxMate.

The Windows version of MaxMate will be available in the first quarter of 1994, while the Macintosh version will be available in the second quarter. Windows and Macintosh viewers will be available in the first quarter.

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Comments

If you have a comment on this or any other article, drop us a fax at (508) 820-3467 or call (800) 622-1108, Ext. 487.



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Unless you enjoy denying yourself, choosing a network laser printer that doesn't have everything you need just doesn't make sense. Which is why the more you shop and compare, the more one printer becomes the clear choice. The Compaq PageMarq.

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Editorial

Network World columnist Scott Bradner was right on target two weeks ago when he called for Internet access providers to beef up security (Oct. 25, page 14). In past months, the Internet has become Page One news in the general press, which isn't surprising given its explosive growth and the role being postulated for this network of networks in the Clinton administration's information superhighway plans.

In exploring why the Internet isn't more widely used for intracompany networking, Bradner cited two key issues: reliability and security. The reliability issue is largely one of perception, according to Bradner, but the security concern is very real and has come to the forefront in the past week with news reports of significant security problems on the Internet. (Ironically, the reports surfaced around the fifth anniversary of the Robert Morris Jr.-launched virus attack on the Internet.)

Security experts say intruders have captured passwords for hundreds, perhaps even thousands, of the computers linked to the Internet. That's sent personnel at the university, government and corporate sites on the Internet scrambling to assess any damage and shore up weak spots in the firewalls established between their private nets and the very public Internet.

The situation got so bad that one access provider was forced to shut down for three days to clean up the mess. All of this has cost users and access providers a lot of time and money.

The situation is a black eye for the rapidly growing Internet access indus try, exposing as it does a darker side of the net. It isn't clear just how wide-spread the problem is, but it has no doubt given current and potential users pause to consider to what extent they can rely on the network.

Recently, we ran a Buyer's Guide to Internet access providers (July 19, page 31) in which we discussed the new services they're offering, as well as new features and pricing that make it easier to tie into the Internet. But, as Bradner contends, they need to move quickly to bolster security if the Internet is going to play more of a role in business networking.

Some Internet purists loathe that idea, but business usage of the Internet is inevitable. It won't be long before lots of companies realize the incredible value of having electronic access to millions of users. But whether the Internet is used for business or personal ends, improved security is vital to its continued growth and Internet access providers need to address that now.

→ JOHN GALLANT

Teletoons

FRANK AND TROISE



SECURITY PERSPECTIVES

by Michel Kabay

ITAR sticks users with unfair encryption restrictions

n Sept. 17, bureaucrats claiming to act in your best interest again interfered with your ability to protect network transmissions using the best, most cost-effective encryption algorithms available. It's time for network managers to take action to stop government meddling in the business of privacy.

U.S. manufacturers are not permitted to export their most powerful encryption tools without a license. The difficulty of obtaining such export licenses forces U.S. manufacturers either to forego

sales outside the U.S. and Canada or to produce a weaker version of their software for international distribution.

The costs of maintaining the different versions are paid for in higher prices for U.S. users. Similarly, giving away foreign markets also decreases the profits of U.S. firms and keeps prices higher than they could be if vigorous competition were the rule.

In addition, U.S. taxpayers have been paying bureaucrats' salaries to apply the International Traffic in Arms Regula-

tions (ITAR) to encryption software. According to ITAR, the Office of Defense Trade Controls of the U.S. Department of State can define anything it wants as equivalent to munitions. There is nothing to stop the bureaucrats from adding the decoder rings found in popcorn boxes to the U.S. Munitions List and designating them as a restricted export.

Just because some paper-pusher claims that encryption is a munition shouldn't make it so. In the words of Lennart Benschop of Eindhoven University of Technology in the Netherlands, "Making cryptographic software equivalent to munitions is just as foolish as making addictive crossword puzzles equivalent to drugs."

The notion that the U.S. government should — let alone can — prevent foreign nationals from having access to encryption technology was never reasonable in the first place, but it's ludicrous today.

Trying to restrict the export of encryption programs in this age of the global Internet is about as useful as trying to keep cigarette smoke from drifting into the no-smoking zone in your favorite restaurant. Trying to control the flow of information via diskette or paper when data can travel unimpeded through the Internet is just plain dumb. How can a government official stop international users from using anonymous File Transfer Protocol to get a copy of any encryption algorithm found on a file server anywhere in the world?

ITAR's application to software is unenforceable and has been for years. One can already find encryption technology of the highest quality everywhere on the planet, ITAR notwithstanding.

On Sept. 17, the latest incident in which the federal government has attempted to enforce these ill-conceived regulations occurred. Grady Ward, president of Austin Code Works (ACW), a software firm in Austin, Texas, was ordered by a U.S. Customs special agent to turn over all paper and electronic documents pertaining to the distribution of ACW's encryption products.

Ward has compiled a 9M-byte anthology of already published encryption source code, which he called "Moby Crypto." This collection includes no execut-

able code — only the algorithmic descriptions in C language that can be found (and exported) from scores of books and journals from the U.S. and elsewhere already freely distributed throughout the world.

Ward argued that the only difference between his cryptographic "whale" and other descriptions of encryption algorithms is that "Moby Crypto" is purely electronic, whereas textbooks and journal articles — which are freely circulated internationally without interference from ITAR — are printed on "paper pulp." Even the Supreme Court, he contin-

ued, will provide its judgments in electronic form, and electronic White House records must be treated with the same respect as official paper documents.

Another software company, Phoenix-based ViaCrypt, was served with a similar subpoena because it recently contracted to sell a commercial version of Pretty Good Privacy (PGP), an encryption utility that has been circulated worldwide via the Internet. Although the first version of PGP was written in the U.S. by software author

Phil Zimmermann, Version 2.0 of PGP came from the Netherlands, not the U.S.

The Electronic Freedom Foundation, which is dedicated to supporting the cause of liberty in cyberspace, has publicly announced its intention to support ACW and ViaCrypt, stating, "Neither of these companies are engaged in the international distribution of any illegal materials... [I]f Moby Crypto contains no executable code, it should be exportable under ITAR, just as textbooks containing such materials are exportable." A legal defense fund has been started to help defray the enormous costs that these two victims of bureaucratic meddling are likely to incur

ITAR is not a dead letter either. The latest modifications to ITAR are reported in the July 22 issue of the Federal Register.

Network managers need encryption technology to secure transmissions against eavesdropping and stored data against unauthorized access. You should brook no interference with the natural evolution of this technology.

The House Foreign Affairs Committee, Subcommittee on Economic Policy, Trade and the Environment held a hearing on mass market cryptography and export controls on Oct. 12 at which speakers from industry expressed outrage over inclusion of cryptography in ITAR. Chairman Sam Gejdenson (D-Conn.) opened the hearing with a statement that summed up the situation pretty clearly: "Just as in the case of telecommunications, the National Security Agency is attempting to put the genie back in the bottle. It won't happen; and a vibrant and productive sector of American industry may be sacrificed in the process."

In (nearly) the words of former Canadian Prime Minister Pierre Trudeau, "The government has no place in the file servers of the nation." Tell your congressional representatives to take cryptography out of ITAR.

◆ Kabay is director of education with the National Computer Security Association in Carlisle, Pa. He can be reached on the Internet at 75300.3232@compuserve.com or by phone at (514) 931-6187.

by Ben Rothke

Health care: Is client/server the cure?

The assertion that the implementation of net-fiscally fainthearted. work computing within health care organizations may be costly (NW, Sept. 20, page 1) may be the came in at more than \$2 million. But the results understatement of the decade. At the National have been well worth it. End users are now more

enced the towering expenditures involved with client/server network computing and downsizing, and have also reaped and experienced the bountiful benefits. We can attest to the fact that client/server network computing is simply more than the buzzword for 1993 — it is the future of information systems (IS) and a fundamental tool for effective corporate computing.

Until 1990, a mainframe and a

Wang Laboraties, Inc. word processing system designed from scratch using Borland Internawere the base setup for NLHC's IS department. tional, Inc.'s Paradox 3.5. End users are overjoyed Three years and a lot of effort later, Novell, Inc. that they are now able to do their own queries and NetWare, Microsoft Corp. LAN Manager, Win- reports rather than having to rely on the maindows and more than 175 Dell Computer Corp. frame technician to run it for them at night or the PCs and servers comprise IS's backbone. We have next day. a significant base of "power users" who are doing real work, not playing Windows solitaire or tweak- NLHC has standardized on WordPerfect Office ing their screen savers.

flagrant fallacies about client/server computing is mainframe CRT any day. Also, using the net verthat it is a bargain. Anyone who has experienced a sion of WordPerfect 5.1 on a PC-based platform downsizing effort can attest to the fact that such a made it easier and quicker for us to develop nursclaim is simply a misrepresentation of reality and pure marketing hype. From network hubs to network interface cards, level-four cabling to multi- version of a software package is cheaper than the

downsizing are not for the



The budget for NLHC's downsizing effort League for Healthcare (NLHC), we have experi- productive and resourceful in the open environ-

ment of PC network computing. The old proprietary systems were simply too limiting for a growing and forward-moving organization like ours.

One example of the increase in productivity via downsizing can be found within NLHC's new database system. Our large membership database

For our electronic mail and scheduling needs, 4.0. The attractive graphical user interface of WP I can intimately declare that one of the most Office for Windows certainly trounces the aged ing certification tests and bring them to market.

An added benefit of downsizing is that the PC user software, the financial outlays involved in mainframe version. We experienced this with the Statistical Package for Social Sciences (SPSS), a

statistical analysis program from SPSS, Inc. NLHC was spending approximately \$6,000 per year to lease SPSS for our mainframe VM system. Early this year we conducted a needs analysis to investigate the feasibility of moving to SPSS for the PC environment. After the analysis, we were able to procure a multiuser license for SPSS for Windows for less than \$5,800, while simultaneously terminating the mainframe lease at the end of the year.

While we will only save \$200 the first year, the residual savings will be \$6,000 per year since we now own the software, rather than having to lease it. Not a bad deal - save money and get a better piece of software! I wish every aspect of downsizing was that easy.

From my downsizing experience at the NLHC, it is clear to me that net computing does, and will continue to, play a critical role in IS for the 1990s and into the next century. It is crucial for all MIS directors to acclimate themselves to a client/server

We have seen that it is possible to downsize from the monolithic mainframe, albeit with a real organized plan and a serious budget. The U.S. is now involved in a similar effort to create a system to manage the health and welfare of all its citizens. It is an effort than makes downsizing seem puny in comparison. But with the technology afforded via network computing, it will make the task that much easier.

> Rothke is director of network computing for the NLHC in New York. He can be reached on CompuServe at 74710,3325.

Letters

Good job

I have just finished reading the Oct. 18 issue of Network World. The in-depth article covering wireless communication devices (Oct. 18, page 41) was terrific!

Keep up the good work.

James A. Babcock Software engineer Eon Corp. Reston, Va.

Count the cost

I enjoyed Cheryl Currid's piece on wireless E-mail (Oct. 18, page

If you get a chance to do a followup story, one approach might be to take a "typical" company and compare conventional E-mail throughput and cost with wireless. Maybe a pharmaceuticals company with salespeople on the road, sending both E-mail messages and order information back to corporate headquarters, or something like

Costs are going to go down, of course, as wireless gets bigger. But early adopters still need cost information to justify embracing new technology.

> George Bigham Consultant Houston

RSA not lagging

I read with great surprise Bruce Schneier's opinion column "DSS licensing plan will hurt users" (Oct. 11, page 39). Mr. Schneier writes:

"Throughout the rest of the world, the RSA algorithm is unencumbered by patents. Because of this, use of RSA for digital signatures has spread rapidly in other coun-

There are several international standards for digital signatures, including the ISO/IEC 9796 standard. Only in the U.S. has digital signature standardization lagged, due in part to PKP's patent; companies have been reluctant to implement a standard that includes patented technology."

This could not possibly be more

wrong. First, there are standards in the U.S. There is ANSI X9.31, now out for ballot, which specifies RSA digital signatures. Also, the Internet standard for Privacy Enhanced Mail (PEM) specifies RSA digital signatures (Feb. 15, page 1).

The Public Key Cryptography Standard, [an open specification that preceded PEM], includes specifications for RSA digital signatures; it was developed and is supported by a group that includes Apple Computer, Inc., Lotus Development Corp., Microsoft Corp., Novell, Inc. and others.

More importantly, RSA is a clear de facto standard in the U.S. A large number of U.S. banks, working with government mortgage agencies and utilizing the GEIS Value Added Network, have been using RSA digital signatures for many years to send mortgage pool data electronically (July 29, 1991, page 13). The National Institutes of Health uses RSA encryption and signatures to securely exchange thousands of authenticated messages a day, containing proprietary DNA sequences, with private-sector biotech firms and universities.

Datamedia's SecureExchange, featuring RSA encryption, signatures, and certificate management, was recently added to the GSA secedule.

RSA digital signatures are used in the 500,000+ installed copies of Lotus Notes. Novell's NetWare 4.0 makes extensive use of RSA digital signatures to provide advanced network authentication services. Apple Computer, Inc. has added RSA digital signatures as a standard feature in its System 7 Pro operating system. Microsoft features RSA digital signatures in its Microsoft at Work products. Almost all of these developments have been reported in the pages of your magazine!

Almost every time you log in to NetWare, send or receive a Notes message, fill or confirm an electronic form, or even load a game cartridge into a Atari game player, you use RSA digital signatures.

How many users does this apply to? Does it seem like these companies, as Mr. Schneier claims, have been "reluctant to implement a standard that includes patented technology?"

With over 2 million products now in use, RSA digital signature use in the U.S. dwarfs, by a very wide margin, any collective use outside See Letters, page 53

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Buyers guide

BY CHRISTOPHER FINN

espite being squeezed from all sides by internetworking products such as routers and public network services, the venerable T-1/T-3 multiplexer continues to be a key part of most large corporate nets due to its reliability and versatility.

And multiplexer vendors are offering modular upgrades and enhancements that lengthen the already admirable life cycle of the standard box.

At the same time, private networks anchored by T-1/T-3 multiplexers are attractive for international installations due to advances in voice compression and the growing availability of affordable digital services abroad (see story, page 49).

In the U.S., there is finally a growing demand for T-3 networking and a need to integrate small branch offices into large corporate backbones. Both of these developments are contributing to the continued success of multipleyers

T-1/T-3 multiplexers still provide an excellent platform for merging voice, data and video on one backbone network. Key for users will be choosing multiplexers that serve their private networking needs today and will integrate well into a public/private hybrid network.

Essentially, a T-1/T-3 multiplexer consists of a backplane — usually a bus — in a modular chassis with board slots that accommodate trunk-side and user-side interfaces as well as add-on processors that enable the multiplexer to support advanced functions such as routing.

Traditional T-1/T-3 multiplexers are now joined by fixed-configuration units, which are more compact and less expensive but do not offer the flexibility of the chassis/board architecture. They consist of a chassis with a fixed number of built-in interfaces that can be con-

trolled, configured and managed via internal software.

Among the critical factors to consider when selecting a T-1/T-3 multiplexer is the type of backplane it uses to move digital bits from one interface board to another. T-1/T-3 multiplexers were originally designed to use time-division multiplexing (TDM) in which data from interface boards is stuffed into specific time slots and trans-

ported across the backplane bus. Today, some vendors are deploying packet and cell switch-

Modular upgrades, an uptick in T-3 usage and branch office access to backbones keep T-1/T-3 muxes positioned as the

network anchor

ing backplanes that break data into small packets or cells that are switched across the backplane bus.

Most T-1/T-3 multiplexer vendors

configuration and management

ADC Fibermux Corp.'s Magnum100

Coastcom's D/1 Mux III and Fractial

Gandalf Systems Corp.'s Gandalf 2050

Racal-Datacom, Inc.'s Omnimux 8000

 Digital Link Corp.'s DL 100 Encore Digital Service Multiplexer

DSC Communications Corp.'s CP4000 and CP3000

🤦 Telco Systems, Inc.'s Route 24

software to units in remote sites.

enable users to download

The exceptions are:

A second and related issue is the functional-

ity of the vastly different type of interface boards. Other important issues in selecting a mux are management, reliability, support and pricing.

In the past, T-1/T-3 muxes were used almost exclusively to link corporate sites over dedicated T-1 facilities. Today, the stakes are much higher. With corporate traffic moving to public network ser-

vices, most muxes now support access to public services in addition to leased lines. Vendors

are adding new interface modules and intelligence to give users the ability to choose the optimum mix of net services.

SHAPING UP THE MARKET

The T-3 multiplexer has staked out the high end of the market. These muxes may support T-1 as well as channelized and unchannelized T-3 interfaces. Some even support Synchronous Optical Network (SONET) trunks. They range from devices that support only one or two T-3 trunks to devices capable of supporting 10 T-3 trunks via a high-speed bus backplane.

T-3 muxes are usually employed for T-1 channel aggregation when it becomes economical to replace multiple T-1 connections for such mainstream applications as interconnecting local-area networks or image file transfer.

The middle of the market is occupied by more widely deployed T-1 multiplexers, which support a private T-1 backbone with sophisticated network management features. T-1 multiplexers can support more than 100 network



trunks and usually, but not always, have a TDM backplane.

U.S. companies bought T-1 multiplexers in droves in the 1980s when T-1 circuits became relatively inexpensive and widely available. They were used to aggregate all forms of corporate traffic onto a single private backbone net.

These same companies, faced with operational downsizing, are now finding advanced public services, such as virtual private networks and frame relay, more economical and easier to manage for voice, video and some data applications.

At the low end of the market are access multiplexers that have one or two T-1 interfaces and are designed to accommodate a mix of dedicated and switched network services at smaller sites. These products enable branch sites to feed traffic into larger multiplexers at a regional facility.

These units are sometimes called intelligent digital channel banks or multiplexing data service unit/channel service units (DSU/CSU). This is because the muxes perform the same functions as those devices but can be configured via software and can be fully integrated into a T-1 backbone network management scheme. This is opposed to other multiplexing DSU/CSUs that offer less sophisticated management in exchange for a lower price.

Each of these three categories of multiplexers is targeted at specific user needs and budgets as the whole industry adapts to the changing networking landscape.

Users have long accepted the ubiquitous T-1 mux but are just now catching on to T-3 networking and the access multiplexer that is used to support branch office networking.

BACKPLANE ARCHITECTURES

The key issue buyers must consider is the device architecture, with the technology used on the backplane being the most critical element. Some question the life span of TDM backplanes in light of emerging packet and cell-switching alternatives.

How muxes move data across the backplane is going to determine whether users will

Continued on page 48

T-1/T-3 multiplexers

Company		Y								- Annual Control of the Control of t	-						_				
	Product		Bus type speed	e/	Framing	Muxing technique	Voice modula- tion	inter	laces/i	nputs	Ports		(Min./Ma	ssion rate	e	Proc	luct	supp	ort	Mgmt.	Price/ Warranty (months)
		C = Channel bank D = Multiplexing DSU/CSU F1= Fractional T-1 mux F3 = Fractional T-3 mux T1 = T-1 mux	A = ATM F = Frame relay T = TDM X = X.25 O = Other	(M bit/sec)	D = D4/CCITT G.733 E = ESF G1 = G.704 G2 = G.732 O = Other	Bi = Bit-interleaved By = Byte-Interleaved F = Fast packet P = Packet 0 = Other	A = ADPCM C = CVSD P = PCM 0 = Other	C = Carrier U = User	Interfaces	A = Asynchronous F = Frame relay I = Isochronous S = Synchronous VI = Voice O = Other	Carrier-side	User-side	Asynchronous data (bit/sec)	Synchronous data (bit/sec)	Voice (bit/sec)	On-site (through third party)	On-site (24-hour internal support)	Overnight shipping of replacement parts Toll-free support number	Remote diagnostics	SNMP support	
	Magnum100	T3	Т	45	0	Bi	P	C	2		1/2	1/512	300/4M	300/			1 0	1 1		~	\$15,000-
Fibermux Corp. (800) 800-4224 ADC Kentrox	Data CMART TO/FO	D, T3	A, O	45	0	F	NA	С	16	A, I, S, VI, VO	1/1	1/1	45M/	10.2M 45M/		~		1 1	~	V	\$40,000/ 12 \$17,000/
(503) 643-1681	DataSMART T3/E3 ADSU			45				U	1	A, S	1/1		45M/	45M/		~		1 1			\$17,000/
	DataSMART T3/E3 SMDSU		0	45	0		NA O D O	CU	1	S	1	1/1	45M	45M	5.001//						24
Timplex, Inc.	LINK/2+ Integrated Connectivity System	F1, T1	Т		D, E, O	Ву	A, C, P, O	U	52	A, I, S, VI, VO	1/12	1/208	45.5/ 19.2K	1.984M	5.33K/ 64K		-				\$5,000- \$7,500/12
(201) 391-1111	TX3/SuperHub	F3, T3	Т		D, E, G2, O	Bi	NA	U	10	1/E-1, HSSI, EIA 530, V.35 Any input with T- 1/E-1, HSSI, EIA 530, V.35	10/10 (1)	90 (2)/201 (3)		100K/ 41M							\$30,000/
AT&T Paradyne (800) 482-3333	Acculink 740	F1, T1	T	2.048	D, E	Bi, By	A, P, O			A, I, S, VI, VO A, I, S, VI, VO	1/1	1/128	300/ 19.2K	1,200/ 1.984M	8K/64K	٠		-			\$10,525- \$45,000/ 12
	Acculink 742	F1, T1	Т	2.048	D, E	Bi, By	A, P, O	C U		A, I, S, VI, VO A, I, S, VI, VO	1/1	1/32	300/ 19.2K	1,200/ 1.984M	8K/64K	•		~	~		\$5,990- \$22,000/
	Model 3140 T1/E1 Multiplexer	C, F1, T1	Т	1.544/2.048	D, E	Bi, By	P	C		A, I, VO A, S, V, O	1/2	1/240	0/ 38.4K	1	64K/ 64K		•		~		\$9,000/12
	D/1 Mux III	C, D, F1,	Т	1.544	D, E	Ву	A, P	C		A, S A, S, VI, VO	1/2	1/48	>0/ 19.2K	1,200/ 1.536M	32K/ 64K	· ·	1	1	~		\$5,000/60
, ,	Fracdial	T1	Т	1.544	D, E, O	Ву	Р	C	1		0/1	1/24		8K/ 1.344M			-	1 1	~		\$7,995/60
Cray Communications,	DCP 9506	C, D, F1,	Т	1.544	D, E	Ву	A, P	C	1		1/1	1/30	50/ 38.4K	600/	32K/ 64K		-	1	~		\$2,750/12
inc.	DCP 9401	C, D, F1,	Т	1.544	D, E	Ву	A, P	CU	1		1/1	1/60	50/ 38.4K	600/	32K/ 64K		-	1	~		\$3,000/12
(800) 367-2729	DCP 9115	C, D, F1,	Т	1.544	D, E	Ву	A, P	С	1	A, F, I, S, VI, VO	1/1	1/120	50/	600/	32K/		/ /	/ /	~		\$4,400/12
	DCP 9900	C, D, F1,	Т	1.544	D, E	Ву	A, P	С	10		1/10	1/120	38.4K	600/	64K 32K/		-	/ /	~		\$16,500/
	DL 3000 Digital	T1 T3	0	200	0	Bi	NA	C	4		1/8	1/56	38.4K 300K/	1.536M	64K	•	/ 0	1 1	· ·	V	\$18,000/
	Service Multiplexer DL 3100 Digital Service Multiplexer	ТЗ	0	44.2	0	Bi	NA	U U	14	A A	1/1	1/3	176.8M 300K/ 44.2M			•	-	, ,	~	~	\$10,995/ 24
	DL100 Encore Digital Service Multiplexer	D, F1, T1	Т	1.544	D, E	Ву	NA	C U	1	S	1/1	1/7		56/ 1.544M		•	-	1	~	~	\$3,695/24
	CP4000	T1	T, X		D, E, G1, G2, O	Ву, Р	A, P	C U		A, I, S, VI, VO A, I, S, VI, VO	2/34	4/136	1,200/ 19.2K	1,200/	34K/ 64K	•	-	1	~		\$12,000- \$60,000/ 12
	CP3000	T1	T, X	73.7	D, E, O	Ву, Р	A, P	C		A, I, S, VI, VO A, I, S, VI, VO	2/16	4/64	1,200/ 19.2K	1,200/ 1.984M	32K/ 64K	•		1	~		\$9,000- \$30,000/
Gandalf Systems Corp. (800) 426-3253	Gandalf 2050	C, F1, T1	F, T, O		D, E, G1, O	Bi, F	A, P, O	C		A, F, I, S, VI, VO	1/64 (5); 80 (6); 8 (7)	1/ 12,000	50/ 19.2K	50/ 1.984M	6.5K/ 64K	~ .	′ ′	/ /	V	~	12 \$30,000/ 12
	TMS-3000 Internetworking Product Family	F1, T1	F, T, A	270	D, E, G1, G2,	Bi, By, F,	A, P, O			A, F, I, S, VI, VO A, F, I, S, VI, VO	1/32	0/512	50/ 19.2K	300/ 1.536M	4.8K/ 64K	•	-	1	~	~	\$7,700/ 12
Larscom, Inc.	Mega-T Multiple T1 Inverse Multiplexer	D, F3	Т	6.112		Bi	NA	C	NA 1	A S	1/4	1/1		1.528M/ 6.112M		~	•		~	~	\$9,900- \$16,500/
	Codex 6250 Digital	C, F1, T1	Т	16	D, E	Ву	A, P	С			1/6	1/90	2,400/	2,400/	16K/		/ v	1			\$6,000/12
Network Equipment Technologies, Inc.	Network Multiplexer STM/18	F3, T3	0	498- 161.7	D, E, O	Ву	NA	U C U	36	A, F, I, S, VI, VO A, S A, S, VO	(10)	2/336	19.2K 1.5M/ 49M	768K 1.5M/ 155M	64K	~ .	-	1 1	V	~	\$95,000/ 12
(415) 366-4400	STM/S	F3, T3	0	498-	D, E, O	Ву	NA	С			(11)	2/96	1.5M/	1.5M/ 155M		~ .	, ,	1	~	V	\$45,000/
	IDNX/Micro 20	T1	F, T	161.7 256	G1, G2,	Ву, Р	A, P, O	C		A, S, VI, VO F, I, S, VI, VO A, F, I, S, VI, VO	1/7	1/360	49M 75/ 19.2K		8K/64K	v .	-	' '	V	~	\$8,500/ 12
	IDNX/20	T1	F, T	256	G1, G2,	Ву, Р	A, P, O	C U		F, I, S, VI, VO A, F, I, S, VI, VO	1/15	1/360	75/ 19.2K	1,200/ 1.536M	8K/64K		, ,	' '	V	~	\$17,000/ 12
	IDNX/20-S	T1	F, T	256	O D, E, G1, G2,	By, P	A, P, O	C		F, I, S, VI, VO A, F, I, S, VI, VO	1/15	1/360	75/ 19.2K	1,200/ 1.536M	8K/64K		10	, ,	~	~	\$9,000/ 12
					0									1.000,							





T-1/T-3 multiplexers

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Description Property Proper	Company	Product	Product type	Bus type speed	e/	Framing	Muxing technique	Voice modula- tion	Inte	faces/	inputs	Ports		Transmi (Min./Ma	ission rate	е	Pro	duct	sup	por	t Mgmt	Warranty (months)
DNX/S0			Channel bank = Fractional T-1 mux = T-1 muc	= ATM F = = TDM X = = Other	(M bit/sec)	3.733 E =	= Bit-Interleaved By = Fast packet P = Other	= ADPCM C = CVSD = PCM 0 = Other	= Carrier	Interfaces	T.S.	Carrier-side	User-side	Asynchronous data (bit/sec)	Synchronous data (bit/sec)	Voice (bit/sec.)	On-site (through third party)	On-site (24-hour internal support)	Overnight shipping of replacement parts	Toll-tree support number	SNMP support	
### FIRST Sames 100 F1. T1 T T 0. O		IDNX/90	1	F, T	256	G1, G2,	Ву, Р	A, P, O				1/96				8K/64K	~	V .			· ·	\$70,000/ 12
## 11/5S Amount 1000 Ft, T1 T 54 D.E. D.B. B, B, F, F O D. 16 F.S. VI U 10 F.S. VI U U 10 F.S. VI U U 10 F.S. VI U U U 10 F.S. VI U U U 10 F.S. VI U U U U U U U U U		#1-ISS Series 10	F1, T1	T, O	64	D, E,	Bi, By, F,	0				1/304	1/304				~	V .	1.		/	\$8,600/3
MacSizeral 3624 MacSizeral 3624 MacSizeral 3624 MacSizeral 3624 MacSizeral 3624 MacSizeral 3626 MacSizeral	(703) 742-6000	#1-ISS Series 1000	F1, T1	Т	64	D, E,	Bi, By, F,	0			F, S, VI	1/64	1/64	19.2K	600/	64K	~	~	,	, ,	,	\$10,300/3
ManStread 3500 F1, T1 T 3 D, E, O By NA C 2 S, VI, VO 22 510 58 K V V V V V S S Flathorn S S Flathorn S S S K S K K V V V V V V V V	Networks, Inc.	Intelligent Channel	C, T1	Т	1.544		Ву	P	С	1	S, VI, VO	1/1	2/96		50/		~	~	•	-	′	\$3,000/
MainStreet 36150	(703) 834-3600	MainStreet 3500 Transmission Access	F1, T1	Т	3	D, E, O	Ву	NA				2/2	5/10				~	~				\$6,000- \$10,000/
MainStreet 36150		MainStreet 3630	F1, T1	Т	3	D, E, O	Bi, By	A, P, O				2/2	2/128				~	~	-	-		\$6,000- \$10,000/ 12
MainStreet Sd3120 F1, F3 F 100 D, E, D B, By, F A, P, D U 64 A, F1, S, V1, VO 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 30 45 50 4,606 4,606 30 45 50 4,606 4,606 30 45 50 4,606 4,606 4,606 30 45 50 4,606			T1, T3	A	2,400	0	F	A, P, O		_		16/16	1	1			~	7	-	-	-	\$20,000- \$200,000 12
MainStreet 3600 High Fig. 17, 3 T 48 D. E. O Bi. By A. P. O C 136 A. I. S. VI, VO 136 2/2 50 50/56K 8K/16K V V V V S S S S S S		Packet Transfer		F	100	D, E, O	Bi, By, F	A, P, O				64/64		1	50/56K		~	~ .	1	-	-	\$30,000- \$200,000 12
Paragon Networks Bandwidth Manager		Capacity Bandwidth	T1, T3	Т	48				U		A, I, S, VI, VO			38.4K								\$40,000- \$200,000 12
International, Inc.			F1, T1	T	24	D, E	Bi, By	A, P, O	U			16/16	1			8K/16K	~	-	-	-		\$10,000- \$60,000/ 12
Bacal-note Bac	International, Inc.	8000 Series		F, T, X					U		A, F, I, S, VI, VO			38.4K	2M							\$2,800/12
Datacom, Inc. Communications, Inc. Comm		T1 Business Bank		Т	3.152				U	48	A, S, VI, VO				1.536M	384K						\$3,200/60
RAD Data Megaplex-2000 F1, T1 F, T, X 2.54 D, E, O Bi A, P C 2 S 1/2 1/40 1,200/ 1,200/ 1,200/ 14K/ V V V S S S S S S S		Omnimux 9000	T1	Т	128	D, E	Ву	A, P	C			1/36	1/144									\$25,000/ 12
RAD Data Communications, Inc. Megaplex-2000 F1, T1 F, T, X 2.54 D, E, O Bi A, P C 2 S 1/2 1/4C 1,200/ 1,200/ 14k/ v' v' v' S S S S S S S S S	(800) 557-2225	Omnimux 8000	T1	T	12	D, E	0	A, C, P	_			1/8	1/200					1	1	-		\$20,000/ 12
Inc. (201) 529-1100		Megaplex-2000	F1, T1	F, T, X	2.54	D, E, O	Bi	A, P	C	2	S	1/2	1/40	1,200/	1,200/		~	~	/			\$4,400/12
StrataCom, Inc. (408) 294-7600 Manager T1	Inc.	Megaplex-2004	F1, T1	F, T, X	2.54	D, E, O	Bi	A, P	C	1	S	1/1	1/32	1,200/	1,200/	14K/	~	~	1			\$2,800/15
Networking, Inc. (800) 477-7585 BMX 45A F3, T3 T 90 D, E, O Bi NA C 2 F, S, VI, VO V 56 S, VI BMX 45N F3, T3 T 800 D, E, O Bi NA C 44.21K V V V S S Access 30 D, F1, T1 T 1.544 D, E, O By NA C 112 S, VI V 56 S, VI V 96 S, VI, VO V 96 S, VI, VO V 1/10 1	StrataCom, Inc.		T1	0	32	D, E	F	A, P, O			A, F, I, S, VI, VO	0/30		1,200/	1,200/1	64K/	~	~	-	-	~	\$15,000- \$100,000
BMX 45A F3, T3 T 90 D, E, O Bi NA C 2 F, S, VI, VO 1/2 1/48 1.544K/ 44.21K 44.2		BMX 45S	F3, T3	T	90	D, E, O	Bi ·	NA				1/2	1/12					~	/ •	-	' '	\$15,000/ 12
BMX 45N F3, T3 T 800 D, E, O Bi		BMX 45A	F3, T3	Т	90	D, E, O	Bi	NA	С	2	F, S, VI, VO	1/2	1/48		1.544K/			~		, ,	· ·	\$32,000/
Teleo Systems, Inc. (800) 776-8832 Route 24 C, F1, T1 T 1.544 D, E By A, P C 1 A, S, VI, VO 1/1 1/96 1/19.2K 1,200/ 1.536M 64K V V V V V S \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$		BMX 45N	F3, T3	Т	800	D, E, O	Bi	NA	С	4	F, S, VI, VO	1/16	1/96		1.544K/			~	1 .	- 0	' '	\$45,000/
Access 30 D, F1, T1 T 1.544 D, E, O By NA C 1 S, VI 1/2 1/4 56/ 1.984K S. Access 48 Intelligent Access Multiplexer C, F1, T1 T 3.088 D, E By A, P C 2 A, F, S, VI, VO U 24 A, F, S, VI, VO 1/2 1/4 1/19.2K 1,200/ 1.536M S. Telematics International, Inc. (800) 833-4580 DX-20 F1, T1 T 6.25 D, E, G2, O DX-50 F1, T1 T 12.5 D, E, Bi A, P C 4 S 1/4 S 1/4 S 50/ 1,200/ 19.2K 2M 64K DX-50 F1, T1 T 12.5 D, E, Bi A, P C 4 S 1/4 1/245 50/ 1,200/ 19.2K 2M 64K DX-50/ 19.2K 2M 64K S 1/4 1/245 50/ 1,200/ 19.2K 2M 64K S 1/4 1/245 50/ 1,200/ 19.2K 2M 64K DX-50/ 19.2K 2M 64K DX-5		Route 24	C, F1, T1	Т	1.544	D, E	Ву	A, P	С	1 24/	A, S, VI, VO	1/1	1/96	1/19.2K	1,200/		~	~		-	~	\$3,365- \$5,165/60
Access 48 Intelligent Access 48 Intelligent Access 48 Intelligent Access Multiplexer Access 48 Intelligent Access Multiplexer		Access 30	D, F1, T1	Т	1.544	D, E, O	Ву	NA	_	1		1/2	1/4				~	~	/ (/	\$3,695-
Telematics DX-10 F1, T1 T 6.25 D, E Bi A, P C 3 S 1/3 4/12 50/ 1,200/ 16K/ V V V V V V V V V			C, F1, T1	Т	3.088	D, E	Ву	A, P	С		A, F, S, VI, VO	1/2	1/44	1/19.2K	1,200/	250/340	~	~		-		\$4,195/60 \$7,100- \$12,395/
(800) 833-4580 DX-20 F1, T1 T 6.25 D, E, G2, O Bi A, P C 3 S 1/3 1/110 50/ 1,200/ 16K/ V V V S DX-50 F1, T1 T 12.5 D, E, Bi A, P C 4 S 1/4 1/245 50/ 1,200/ 16K/ V V V S		DX-10	F1, T1	Т	6.25	D, E	Bi	A, P				1/3	4/12				~		/ .		,	\$11,000/6
DX-50 F1, T1 T 12.5 D, E, Bi A, P C 4 S 1/4 1/245 50/ 1,200/ 16K/ V V V S		DX-20	F1, T1	T	6.25		Bi	A, P	С	3	S	1/3	1/110	50/	1,200/	16K/	~		/ .		,	\$12,275/6
			F1, T1	T	12.5	D, E,	Bi	A, P	С	4	S	1/4	1/245	50/	1,200/	16K/	~		/ .	, ,	/	\$15,625/6
		DX-Mod	F1, T1	Т	12.5	D, E,	Bi	A, P	С	8	S	1/8	1/509	50/	1200/	16K/	V		/ .		1	\$21,160/6

cts highlighted by color were selected for The Short List.

FOOTNOTES:

(1) Can be either 10 DS3s or 10 E-3s. (2) 10 T-3s and 80 T-1s. (3) 5 T-3s and 196 T-1s. (4) 4 primary ports plus 4 protection ports. (5) Max. of 64 E-1s.

(6) Max. of 80 E-1s. (7) Max. of 8 E-3s. (8) Max. of 3 DS3s. (9) Max. of 40 DS0s. (10) 8 OC3s, 18 DS3s, 336 DS1s. (11) 4 OC3s, 8 DS3s, 96 DS1s. (12) 1 interface plus 1 redundant backup.

ADPCM = Adaptive differential pulse code modulation
ATM = Asynchronous Transfer Mode
CVSD = Continuously variable slope delta
DSU/CSU = Data service unit/channel service unit
ESF = Extended superframe format
HSSI = High Speed Serial Interface
NA = Not applicable
TDM = Time-division multiplexer

SOURCE: TELECHOICE, INC., VERONA, N.J.

T-1/T-3 multiplexers

Company	Product	Product type	Bus typ speed	e/	Framing	Muxing technique	Voice modula- tion		rfaces/	inputs	Ports		Transn (Min./M	nission rat lax.)	le	Pro	duc	t sup	por	t Mgmt.	Price/ Warranty (months)
		= Channel bank D = Multiplexing DSU/CSU 1= Fractional T-1 mux F3 = Fractional T-3 mux T3 = T-3 mux	A = ATM F = Frame relay T = TDM X = X.25 O = Other	(M bit/sec)	D = D4/CCITT G.733 E = ESF G1 = G.704 G2 = G.732 O = Other	Bi = Bit-interleaved By = Byte-Interleaved F = Fast packet P = Packet O = Other	A=ADPCM C=CVSD P=PCM 0=Other	C = Carrier U = User	Interfaces	A = Asynchronous F = Frame relay I = Isochronous S = Synchronous VI = Video O = Other	Carrier-side	User-side	Asynchronous data (bit/sec)	Synchronous data (bit/sec.)	Voice (bit/sec)	On-site (through third party)	On-site (24-hour internal support)	Overnight shipping of replacement parts	Toll-free support number	Nemote diagnostics SNMP support	
		OFF				4	anie terraine					mai, ac ung recamata a	nego comprehensivo com a com a	The state of the s				-	-		
Tellabs	Crossnet 445	F1, T1	T	2	D, E	Bi, By	NA	С	16	NA	2/16	NA	NA	NA	NA	~	~	V	1 1		\$8,500-
Operations, Inc. (708) 969-8800								U	16	NA											\$37,000/ 12
(700) 500 5000	Crossnet 440	F1, T1	T	2	D, E	Bi, By	A, P, O	С	2 (12)	A, S, VI, VO	1/2	4/128	300K/ 19.2K	1,200/ 1.536M	8K/ 1.544M	~	~	V 0	1		\$7,000- \$12,500/ 12
								U	16	A, S, VI, VO											
TyLink Corp.	ONS 400	D, F1, T1	T	1.544	D, E	Ву	NA	С	1	F, S, VI, VO	1/1	1/4		2.4K/		V	~	10	10	1 1	\$2,950-
(800) 828-2785								U	4	F, S, VI, VO				1.536M							\$4,450/12
	SNS 256	D, F1, T1	T	1.544	D, E	Ву	NA	С	1	F, S, VI, VO	1/1	1/4	1	2.4K/	, ,	V	1	10	1 0	1	\$3,995-
								U	4	F, S, VI, VO				1.536M	the state of the s						\$5,495/12
	SNS 400	D, F1, T1	T	1.544	D, E	Ву	NA	С	1	F, S, VI, VO	1/1	1/4		2.4K/		V	~	V 0	10	· ·	\$4,995-
								U	4	F, S, VI, VO				1.536M							\$6,495/12
	SNS 4000	D, F1, T1	T	1.544	D, E	Ву	NA	C	1	F, S, VI, VO	1/1	1/4		2.4K/	The second secon	V	~	V 0	1 1	1	\$8,995/12
										F, S, VI, VO				1.536M							

Products highlighted by color were selected for The Short List.

FOOTNOTES

(1) Can be either 10 DS3s or 10 E-3s.

(2) 10 T-3s and 80 T-1s.

(3) 5 T-3s and 196 T-1s. (4) 4 primary ports plus 4 protection ports. (5) Max. of 64 E-1s.

(6) Max. of 80 E-1s (7) Max. of 8 E-3s.

(8) Max. of 3 DS3s.

(9) Max. of 40 DS0s (10) 8 OC3s, 18 DS3s, 336 DS1s.

(11) 4 OC3s, 8 DS3s, 96 DS1s.

(12) 1 interface plus 1 redundant backup

ADPCM = Adaptive differential pulse code modulation ATM = Asynchronous Transfer Mode

CVSD = Continuously variable slope delta

DSU/CSU = Data service unit/channel service unit

ESF = Extended superframe format

HSSI = High Speed Serial Interface

NA = Not applicable TDM = Time-division multiplexer

SOURCE: TELECHOICE, INC., VERONA, N.,

Continued from page 45

be able to smoothly upgrade to higher transmission speeds or have to buy new customer premises equipment to support future networking. Because of the way they have been architected, it will be difficult for any T-1/T-3 multiplexer to support emerging broadband networking on a large scale.

What was once a homogeneous class of equipment used almost exclusively as T-1 TDM backbone nodes is now a varied collection of devices supporting a range of technologies. Users are finding it difficult to understand the significance of the various and sometimes contradictory vendor claims regarding architecture and migration possibili-

While it is difficult to generalize about the strengths and weaknesses of particular architectural approaches, it is important to know the limitations of the various vendor implementations. The big question right now is how and when to integrate cell- and packet-based technologies into the TDM device.

Currently, the backplane of all T-1/T-3 multiplexers is a shared bus that provides a facility for the interconnection of interfaces. The bus can be circuit-, cell- or packet-based. Circuit buses establish fixed links or set aside certain time slots to shuttle data between boards. Cell buses segment data received from one board into small fixed-length cells that get switched across the bus. And packet buses function in the same manner as cell buses except that data is encapsulated in variable-length packets. Of the three, circuit buses are the least prone to adding transmission delay but are the least efficient in utilizing capacity.

The majority of T-1/T-3 multiplexer vendors advocate that device backplanes be made as simple and reliable as possible to provide a stable integrated networking platform. This



The Short List

T-1/T-3 multiplexers

The Short List highlights products Network World recommends you examine during the purchasing process for T-1/T-3 multiplexers. Products included on The Short List meet the buying criteria outlined here and, in some cases, offer additional useful features. Those criteria reflect the needs of users with multivendor enterprise networks. Your criteria may differ based on network configuration and application needs.

Network Equipment Technologies (NET), Inc.'s IDNX family. The NET IDNX line is ideal for networks that must support voice, video, local-area network and legacy data applications. NET has a solid reputation for reliability and quick response time on service. Its IDNX line features integral frame relay, digital voice and voice compression, and routing capabilities.

The smallest version is the IDNX/Micro

256M bit/sec of network capacity, including as many as four T-3s. The whole IDNX line can be managed from NET's proprietary management platform, the Unix-based NetOpen/5000. NET provides support in more than 50 countries.

20, which starts at \$8,500 and uses the same

interface boards as the larger models. The

IDNX/90, the largest model, can support

■ StrataCom, Inc.'s IPX Bandwidth Manager. The StrataCom IPX utilizes an efficient cell relay-based backplane, making it especially suited for frame relay applications. This strong frame relay support prompted many public network carriers to choose the IPX as the hardware platform for their frame relay services.

The IPX line starts with the IPX 8, with eight interface board slots, and scales up to the IPX 32, which boasts 32 board slots. The

product line is flexible enough to support voice and video applications that require constant bit rate channels and voice compression, too. The IPX line also features interfaces that enable connection to the Japanese telephone network. Finally, the IPX is compatible with StrataCom's BPX Broadband switch. The IPX line ranges in price from \$15,000 to \$100,000.

■ Telco Systems, Inc.'s Route 24. The Route 24 is a full-featured T-1 access multiplexer with alternate routing and channel prioritization capabilities. It offers a Frame Relay Assembler/Disassembler interface board as an option targeted at linking IBM Systems Network Architecture devices to public frame relay networks.

The Route 24 also offers an inverse multiplexing module that is compliant with Bandwidth On-Demand Interoperability Group standards. Telco Systems supports all of its equipment with a standard five-year warranty — more than any other vendor. It's a good choice for users that need to access both private and public network services and are looking for bulletproof reliability. It ranges in price from \$3,365 to \$5,165.

group includes most of the traditional market leaders, such as General DataComm, Inc. and Network Equipment Technologies, Inc. (NET), and some of the T-3 vendors, such as T3plus Networking, Inc.

Making the backplane simple means putting cell and packet switching functions on interfaces that traverse the reliable circuitbased TDM bus. In other words, circuitry on the interface board encapsulates user data into cells, packets or frames that are transported in

time slots across the TDM bus. This enables users to take advantage of the statistical multiplexing efficiencies of frame relay, for instance, but only within a fixed-bandwidth channel.

TDM is protocol-transparent and has excellent delay characteristics, making it well suited to the aggregation of various types of traffic, including voice and video, which require that delay be minimal and constant. The advantage of this approach is that the appropriate technology can be chosen for each

application — such as frame relay for LAN interconnection and fixed-bandwidth circuits for voice or video — while the multiplexer acts as a stable multiapplication platform.

This capability will be a priority for users hoping to carry multiple types of traffic over a private backbone. It has been and will continue to be a key multiplexer selling point.

Applications suited to frame and cell transport, such as LAN interconnection, are run across an overlay network of fractional T-1

channels on a T-1 or T-3 circuit, while voice and video can be carried via TDM channels on the same T-1 or T-3 circuit.

This design also supports integrated T-1 access to various carrier services, including fractional T-1, frame relay and virtual networks, over a single T-1. Individual 64K bit/sec DS0 or fractional T-1 channels are simply allocated to each interface.

However, when an application is not sending anything in its time slot, there is wasted backplane capacity. Assuming that the backplane has excess capacity, this is not noticeable to end users.

THE NON-TDM CAMP

On the other side of the coin are vendors led by StrataCom, Inc. that are pushing their backplanes toward new cell switching technologies such as Asynchronous Transfer Mode (ATM) by supporting cell-based data transfers across the bus.

Essentially, a cell-, packet- or frame-based backplane puts all forms of user data into fixed-length cells or variable-length packets or frames that traverse the backplane. Those cells, packets or frames are then converted

Ascom Timeplex,
Inc., Network
Equipment
Technologies, Inc.
and Newbridge
Networks, Inc. have
all introduced ATM
devices outside
their mainstream
multiplexer lines,
pointing out that
ATM development
is traveling a
separate path from
mux efforts.

back to the original data form for delivery to the corresponding interface. No backplane capacity is spent on transmitting empty time slots.

These devices are ideally suited to networks that consist primarily of LAN traffic but are proving versatile for multiapplication networks, as well.

They provide the

same range of interface boards as more traditional devices and can work with similar voice compression and constant bit rate features.

Still other vendors have chosen to package units with multiple types of backplanes, with some traffic going over a packet or cell bus and other traffic going over a TDM bus. An example is Netrix Corp.'s #1-ISS Series 10, which is segmented with multiple bus types for carrying various types of traffic.

Overall, the cell solution is more efficient because it does not dedicate bandwidth to an

interface unless it is requested. The TDM design does allow time slots to go idle.

Some vendors, such as Ascom Timeplex, Inc., General Data-Comm, Motorola Codex and NET, have attempted to blanket the market by offering multiple product lines that give users a choice of technologies but do not necessarily provide a totally painless migration plan for installed users. However, they are providing ways to integrate current devices as smaller parts of the future architecture.

Providing ways to integrate existing products with future ones makes sense as current architectures will not scale up to the demands of the backbone

node requirements of broadband networks that support such SONET speeds as the Optical Carrier-12 rate of 622M bit/sec.

However, users should consider future

bandwidth needs and look for integrated management and interconnection. If a vendor's diagrams of ATM networking do not include the multiplexing devices you own or are thinking about purchasing, chances are that smooth migration is not the vendor's priority.

It is generally acknowledged that vendors will not be using the classic T-1/T-3 multiplexer at the center of their future broadband ATM implementations.

One possible migration strategy is for a vendor's ATM switch to interoperate with its installed multiplexers. For instance, Ascom Timeplex's ATM-based Enterprise Switch will be able to convert LINK/2 T-1 multiplexer traffic to ATM, and vice versa, rather than just carrying it over the ATM backbone. For its part, NET has announced an ATM interface for its IDNX line of T-1 multiplexers. That interface will encapsulate non-ATM data into ATM cells for transport across the wide area.

The other issue relating to bus architecture is capacity. Overall, bus capacity is indeed probably more relevant in the near term than the underlying technology. In other words, it does not matter how data is transported across a backplane as long as the capacity is there. All the units listed in the Buyer's Guide chart starting on page 46 use a bus backplane.

"Bus-based architecture can only take you to about 1G bit/sec," says Brian Button, Strata-Com's product-line manager. Bus performance starts to drag after 1G bit/sec. Users can link multiple buses together to achieve higher throughput but that is only a bandaid solution. "From there, you need to look at cross-point switching."

Cross-point switching is essentially a fully active switching fabric in which cells travel across a matrix that routes them based on a series of binary decisions. It is generally accepted as the core technology of high-capacity ATM switches.

StrataCom's IPX is built on a cell-based bus, but its high-capacity BPX ATM switch is based on a 9.6G bit/sec cross-point switch. General DataComm also makes a cross-point switch-based ATM product — its APEX 6.2G bit/sec switch. None of the products listed in the Buyer's Guide chart is based on a cross-point switch architecture.

SCALABILITY

Most T-1/T-3

multiplexers support

hot-swappable

components, which

enables users to change parts without

taking the multiplexer

off-line.

The exceptions:

all muxes from

Larscom, Inc.'s Mega-T Multiple T1 Inverse Multiplexer

Ominimux 8000

Access 30

> Telco Systems, Inc.'s

> Racal-Datacom, Inc.'s

ADC KentroxDigital Link Corp.

> Tylink Corp.

As networks expand in both bandwidth and number of locations, it is critical to buy multiplexers that can be scaled up through

additional interfaces and cabinet linking.

Users planning network expansion may choose to purchase multiplexers with chassis and backplanes that can support expansion solely through add-on boards. Board expansion is not limited to units with a particular type of backplane, but, again, each unit has its own constraints. It really comes down to cost.

While it is possible to link multiple cabinets with most units, incremental costs are significant if the unit is not meant for large-scale operation. Buying twenty little multiplexers will be more expensive than buying one large box, just like a two liter bottle of Pepsi is less expensive than

the equivalent number of individual cans.

Also important is how vendors accommodate locations of varying sizes. This issue is becoming increasingly significant as branch

Selecting a mux for international networking

Despite the trend in the U.S. of migrating traffic off private networks to public net services, companies are installing international digital private-line highways at a high rate.

Because users have found themselves continually frustrated by the lack of low-cost international public network services for voice and facsimile, they are building private networks to bridge the gap.

"Nobody is building entirely new domestic T-1 networks, so what little growth there is in this industry is [happening] abroad," says Martin Dintzis, an analyst with the Datapro Information Services Group in Delran, N.J.

The buying criteria for T-1/T-3 multiplexers that support international applications is a bit different from those for domestic applications. Most stem from difficulties that arise from not having qualified personnel in foreign countries to maintain equipment and from limited access to bandwidth.

A major decision-making criterion for international private nets is voice and fax compression capabilities. Due to the relatively low cost of public services in the U.S. for voice and fax, this is not a big issue domestically.

But internationally, where even a 64K bit/sec circuit can cost thousands of dollars a month, and voice calls can be several dollars per minute, compression is key to getting the most out of the dedicated facility.

Some proprietary compression schemes allow for voice over 8K bit/sec channels. Also, the major vendors are now supporting G.728, a Telecommunication Standardization Sector (formerly CCITT) standard for audio transmission at 16K bit/sec.

Datapro's Dintzis adds, "The real strength of these vendors is their experience with voice and data integration, and their [time-division multiplexing] products do this

quite well."

A second issue is availability. Not every vendor can supply its equipment in all desired countries. Each model of hardware must be certified for use with each country's electrical and network systems. This highly bureaucratic process can take months for a vendor to complete and makes it difficult to swap equipment wholesale.

Another issue is that multiplexers are increasingly required to access Integrated Services Digital Network nets as well as other domestic and continental public networks. It is important that units support X.21 dialing in Europe, while the X.50 multiplexing scheme for interconnection of international networks becomes very important for linking South American countries.

The last and possibly most significant factor to consider in selecting a T-1/T-3 multiplexer for international networking is vendor

While it costs money to station staff around the globe, many vendors offer their field office technical staffs to users as extensions of their own resources.

But users can rarely rely on foreign telephone companies for the level of installation and management support they get from U.S. carriers abroad. This means that the equipment provider plays a vital role in supporting global networks.

Many multiplexer vendors, such as Ascom Timeplex, Inc., General DataComm, Inc. and Network Equipment Technologies, Inc. offer a full range of international support options such as on-site maintenance and remote monitoring and diagnostics capabilities. All report that they have seen a rise in the requests for outsourcing of international locations.

BY CHRISTOPHER FINN

offices come on to the typical corporate net.

Some vendors such as Ascom Timeplex, General DataComm and NET have expanded their core line of multiplexers to include lowcapacity, low-priced boxes that are completely interoperable with networks using their larger siblings.

NET offers its IDNX/Micro 20, which can use the same boards as its large IDNX units. In addition, the whole network can be managed as a single system. The ability to use a common set of boards makes it easy to use the same equipment in different sites, regardless of the specific models installed there.

ADT Security Systems, Inc. has a network of NET IDNX multiplexers, including a few high-end IDNX/90s. "The majority of our units are IDNX/20s, and the whole network can be managed from a single terminal," says Paul Prekaris, ADT's senior communications specialist. "Full coverage of all required locations made the difference for NET."

Ascom Timeplex is another major vendor whose products use a common set of interface boards.

Several other vendors offer similar integrated solutions. StrataCom has introduced a low-end version of its IPX, the IPX 8, which supports eight interface boards of the same type as its larger siblings. These smaller units

also incorporate some value-added functions such as routing.

Lastly, there are now options, such as the Telco Systems, Inc. Access 30, that feature a fixed-chassis architecture suited for small sites. These ''intelligent'' multiport DSU/CSUs provide access to the backbone network and public network services at a lower cost than a modular unit. What puts them above the typical DSU/CSU is their integrated management with larger units.

T-3 AND BEYOND

Another issue users should consider is the ability to migrate from T-1 to T-3. Users with more than a few T-1s between two locations are finding it economical to subscribe to a T-3 service that requires upgrades in access equipment. This can mean new interfaces for an existing unit or totally new equipment.

While only the NET IDNX/90, Newbridge Networks, Inc. MainStreet 3645 High Capacity Bandwidth Manager and General Data-Comm TMS-3000 Internetworking Product Family are designed to easily move from T-1 to T-3 network trunking with the simple addition of T-3 interface boards, these devices are not necessarily designed for extensive T-3 networking.

Continued on page 50

Company	Product	Ca	rrle	r-slo	le Ir	nter	face	S										Us	er-s	lde	Inte	rfac	es ((1)						
		Analog	SOO	2-wire switched digital 56/64	4-wire switched digital 56/64	DSO	Fractional T-1			T-3	E-3	PRI	Frame relay	SMDS	ATM	Satellite	Microwave	Analog 2-wire	Analog 4-wire	FXS	FXO	Q.732	E&M signaling	D4	RS-232	RS-449	HSSI	X.21	Ethernet	
ADC Fibermux Corp. ADC Kentrox	Magnum100 DataSMART T3/E3 ADSU DataSMART T3/E3									V	V V			7	~										V	~	V		V	
Ascom Timplex, Inc.	SMDSU LINK/2+ Integrated Connectivity System	V	V		~	~	~	~	~			~				~	V	V	~	~	~	~	~	~	~	~		~		-
AT&T Paradyne	TX3/SuperHub Acculink 740 Acculink 742		V	V	V	V	V	ソソ	レン	~	~					ンソン	ンソン	V	レレ	V	~		V	ンソン	V	ンソン	~	7		+
Canoga-Perkins Corp.	Model 3140 T1/E1 Multiplexer						~	~	~									~		~	~		~			~				-
Coastcom	D/1 Mux III Fracdial DCP 9506	V	~		V	~	V V	ソソ										7	V	V V	7		ンソソ	~		ソソソ				+
Communications, Inc.	DCP 9401 DCP 9115 DCP 9900	レンン	V V		V V	V V	V V	ソソ										ソソソ	レレン	レンン	ンンン		ンソソ	V	777	ソソ				1
Digital Link Corp.	DL 3000 Digital Service Multiplexer DL 3100 Digital Service Multiplexer DL 100 Encore Digital						v	V	~	V														~		ンソソ	~			
DSC Communications	Service Multiplexer CP4000	V	V			V	V	V	V							V	V	V	~	V	V		V	V	V	V		V		
Corp.	CP3000	V	~			V	V	~	V		~					V	~		1	~	~		~	~	~	レン		V		
Gandalf Systems Corp. General DataComm, Inc.	Gandalf 2050 TMS-3000 Internetworking Product Family	7	~	V	~	~	V	7	~			~	V			V	ンン	ンン	V	ンン	ンン	7	7	7 7	77	~	~	7	~	
Larscom, Inc.	Mega-T Multiple T1							~																	~	~	~			t
Motorola Codex	Inverse Multiplexer Codex 6250 Digital Network Multiplexer	v	V			~	~	~	V							V	~	~	v	~	V		~	~	~			~		
Network Equipment Technologies, Inc.	STM/18 STM/S IDNX/Micro 20 IDNX/20 IDNX/20-S IDNX/70 IDNX/90		レンソンソ			ンソソソ	ソンソンソンソ	ソンソンソン	ンソンソンソ	V V	~		ンンンンン	2222	7	ンソンソン	2222		ンソンソン			2 2 2 2 2 2 2	してくてく	2222	ンソン	1 2 2 2 2 2 2 2	V	2222	ンンンンン	
Netrix Corp.	#1-ISS Series 10		V			V	V	~	V				V V			V	~							~	7			V		
Newbridge Networks, Inc. (703) 834-3600	#1-ISS Series 1000 MainStreet 3624 Intelligent Channel Bank MainStreet 3500 Transmission Access Platform MainStreet 3630					V	<i>V</i>	\ \ \ \	V			~					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	~	~	~	~		~	ンンン	~	2		7		
	Primary Rate MainStreet 36150 ATMnet MainStreet 36120 Packet Transfer Exchange MainStreet 3645 High Capacity Bandwidth					v	v	v	v	V	v		V			· ·		V	~	~	V		~	V	٧	7		~		
	Manager MainStreet 3600 Bandwidth Manager					~	~	~	~									V		~	~					~		~		
Paragon Networks International, Inc. Pulsecom	8000 Series T1 Business Bank	V	~	v	V	V	V	V	~								~			~	~		V	~		7				-
Racal-Datacom, Inc.	Omnimux 9000 Omnimux 8000		V		~	V V	レレン	ンソ	V	~						V.	1		v v				V	٧ ٧	-	7 7 7		~		1
Communications, Inc. StrataCom, Inc.	Megaplex-2000 Megaplex-2004 IPX Bandwidth Manager		~		V			V	~	v	~	· · · ·	~		~	~	~			V V	ンン	7 7	V V	~	ンとと	ンソン		~	V	
T3plus Networking, Inc.	BMX 45S BMX 45A BMX 45N							ソソソ	ンソソ	ンソン	ンソソ													-			ソソ	V V		+
Telco Systems, Inc.	Route 24 Access 30 Access 48 Intelligent	V	V		v		V V	ソソ	V									V	V	V	V		v	V	V	ンン				-
Telematics International, Inc.	Access Multiplexer DX-10 DX-20 DX-50		VV			V	ンンン	V V	V V			V V				レン	~	ンンン	_			として	~	V	V	ンソン		V V		+
Tellabs Operations, Inc.	DX-Mod Crossnet 445		V			V	V	V	V			~				V	7	~	V			~	~	~	~	/		~		1
TyLink Corp.	ONS 400 SNS 256	~	V	~	V	~	ソソソ	V V	V V							V	V	V	V	V			V	V	V	ンソン				
FOOTNOTE:	SNS 4000 SNS 4000 ATM = Asynchronous Trai						V	V				V												ソソ		ンン			Mı	-

Continued from page 49

The T3plus BMX 45 offerings, NET STM/S and Ascom Timeplex TX3/SuperHub are designed specifically for T-3 and higher speed trunks. They support applications requiring T-3 and fractional T-3 bandwidths via inverse multiplexing.

Although initial take-up of T-3 networking is slow, some users are finding it to be the only alternative for high-bandwidth transport

Tom Stephens, network analyst with Cray Research, Inc. of Chippewa Falls, Wis., is one of those with few options. He manages a network based on T3plus BMX 45s.

Cray's decision for a T-3 backbone was driven primarily by the fact that terrestrial T-3 facilities now cost about the same as six T-1s in Wisconsin and Cray could provide redundant facilities via private microwave.

"We needed more bandwidth now and did not want to be at the mercy of the telephone company for future service deployment," Stephens says. "We are also positioned to use the BMX 45s for SONET and ATM when those services become available."

Cray's network employs Cisco Systems, Inc. routers connected to the T3plus units via the High Speed Serial Interface (HSSI), which supports user applications at speeds up to 52M bit/sec (NW, Sept. 13, page 91).

VALUE-ADDED PROCESSORS

Devices also vary in the types of interface boards offered and the degree of intelligence placed in those boards. At a minimum, devices should support interfaces to public services as well as private T-1.

Many manufacturers, including NET, StrataCom and Netrix, now offer interface modules that support private frame relay networking in various forms.

General DataComm has announced it will offer a frame relay module for its TMS line of multiplexers in January. The StrataCom IPX, which has been chosen as the basis for several public frame relay services, features sophisticated congestion management and data prioritization.

Telco Systems offers interface boards for its multiplexers that provide a Frame Relay Assembler/Disassembler function for connecting IBM Systems Network Architecture equipment to public frame relay services. The StrataCom IPX supports ATM at T-1 speeds and can be used in conjunction with Strata-Com's BPX broadband ATM switch.

For users that have already installed a T-1/T-3 network, it can be much more cost-effective to upgrade to ATM by inserting a board than to buy a complete switch. However, the multiplexer architecture will not support ATM at high speeds such as 622M bit/sec.

Also on the horizon are direct SONET interfaces. T3plus has been beta-testing a SONET interface for its BMX 45 for several months. General DataComm's TMS-3000 model also incorporates SONET interfaces that will allow users to migrate from T-1/T-3 trunking to SONET trunks as they become available from local and long-distance carriers.

In the ongoing battle for control of the internetwork, multiplexer manufacturers have started integrating routing and bridging functions at the board level. These boards function the same way an external router does but can be managed as part of the T-1/T-3 mux and can take advantage of its system redundancy.

ADC Fibermux Corp., Gandalf Systems Corp., General DataComm, Larscom, Inc., NET and RAD Data Communications, Inc.

SOURCE: TELECHOICE, INC., VERONA, N.J.

offer direct LAN interface boards with integral bridge/routing functionality. Some of these units are high-bandwidth T-3 devices targeted at single-application networks, such as the Larscom Orion 4000 Broadband Access Multiplexer and ADC Fibermux Magnum 100.

More significant is that products from mainstream manufacturers, such as NET's IDNX and General DataComm's TMS-3000, are offering integrated routing.

Users seem to have mixed feelings about this development, with some favoring the added manageability and lower cost of integrated routing and others not willing to switch from the stand-alone devices from vendors such as Cisco System, Inc. and Wellfleet Communications, Inc.

Cray's Stephens says he is "not anxious to put more eggs in that [multiplexer] basket. There really is no incentive for me to make a change from our current router vendor."

Also on the rise is the appearance of inverse multiplexing modules. These boards provide the capability to combine multiple individual channels to provide aggregated bandwidth to a single application.

Inverse multiplexing comes in two flavors: Nx56/64K bit/sec for public switched digital services and NxT1 for dedicated connectivity. The former is ideal for videoconferencing and private network overflow at sub-T-1 speeds, while the latter is used for T-1 aggregation and high-bandwidth applications requiring a contiguous fractional T-3 service.

Ascom Timeplex, General DataComm, Racal Datacom, Telco Systems and other vendors produce interface modules that perform Nx56/64K inverse multiplexing. Ascom Timeplex, Larscom, NET and T3plus make units that can provide NxT1 functionality.

MANAGEMENT ON THE RISE

The mainstream T-1/T-3 multiplexer is known for its extensive proprietary management capabilities. Virtually all of the units listed in the Buyer's Guide chart support extended superframe format monitoring, selftesting, loopback and user-defined alarms.

While some of these capabilities have been ported to integrated management platforms, vendors have been slow to embrace the Simple Network Management Protocol, the current de facto standard.

Most multiplexer vendors claim that SNMP is not ideally suited to the extensive management capabilities of their muxes and that the

How important

to your current

purchasing

decisions is an

architecture

based on cell

switching?

1%

32%

How important

will it become

over the next

2 years?

2%

31%

31%

15%

22%

36%

Open Systems Interconnection's Common Management Information Protocol is the best solution, especially when the units are deployed in a large carrier or outsourcer network.

All of the vendors do plan to eventually support SNMP, if only for alarming. Such support will enable SNMP-based workstations to receive alarms from T-1/T-3 multiplexers when something goes wrong. But correcting the problem will require use of the multiplexer's management system.

While ADC Fibermux, ADC Kentrox, Gandalf, General DataComm, Larscom, NET, StrataCom, T3plus and Tylink Corp. all claim some support for SNMP, most require that users perform the majority of management tasks via their respective proprietary management applications.

ADT Security Systems' Prekaris is pleased with the integration afforded by his single-vendor IDNX solution. "We do not have technical people at our remote sites," he says. "This setup provides excellent visibility and control.'

KEEPS GOING AND GOING...

If there is one thing the T-1/T-3 multiplexers have going for them, it is a reputation for bulletproof reliability. While virtually all units provide redudant physical components, users should be aware of some of the interesting features of particular units.

For instance, the NET IDNX line features

intelligent interface boards that Of the 24 vendors in can function independently in a the Buyer's Guide chart static mode should the manageon pages 46-48, 14 ment module go down. Interfaces only rely on the common management software logic for updates and changes, standard platforms Hewlett-Packard Co.'s NetView/6000, and

have ported their

proprietary

to run on industry

such as

OpenView, IBM's NetView and

SunConnect's SunNet

Manager.

while ongoing processing can be performed on the board. Another example is T3plus' products, which support intelligent interface boards that can sustain connections when the CPU boards are removed. General DataComm's systems can

function without a management

system in emergencies.

The majority of the units in the Buyer's Guide chart also feature automatic alternate routing in cases of node failure. Many also boast channel prioritization, which allows for certain connections to be rerouted first when recovering from an outage.

Units from AT&T Paradyne, DSC Communications Corp., Gandalf, NET, StrataCom, T3plus and Tellabs Operations, Inc., as well as the ADC Fibermux Magnum 100, all feature redundant power and processors as standard. Several other units feature them as an extracost option. Whether the user springs for this extra option depends on the application. A box that does not support a mission-critical application does not require redundant power supplies, while a major network hub does.

SUPPORT

With international networking on the rise, product support becomes an increasingly Continued on page 52

Reader views on T-1/T-3 multiplexers Based on 100 interviews

How important to

your current

purchasing

decisions is an

architecture

based on

time-division

multiplexing?

1%

How important

will It become

over the next

2 years?

46%

12%

32%

- 78 readers collectively have 1,235 T-1 multiplexers installed currently.
- Within the next 12 months, 91 readers collectively intend to purchase 222 T-1 multiplexers.
 - 78 readers collectively have 126 T-3 multiplexers installed currently.
- Within the next 12 months, 90 readers collectively intend to purchase 57 T-3 multiplexers.

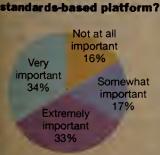
T-1/T-3 multiplexer selection criteria

Based on highest possible score of 10

	•	
Criteria	Importance rating	Satisfaction rating
Management	8.29	7.22
Support for a wide variety of circuit allocation methods	8.10	7.10
Interfaces to frame relay, SMDS and ATM	7.99	6.20
Card availability for add-on functions like routing, bridging and inverse multiplexing	7.75	6.49
Ease of use	7.73	7.45
Price	7.19	7.51
A cell switching backplane	6.43	5.59
A time-division multiplexer backbone	6.32	6.58

SMDS = Switched Multimegabit Data Service

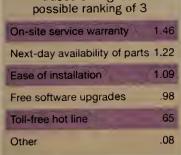
How Important is It that muitiplexer management software run on a



15% 43% Key Extremely important Very important Somewhat important Not at all important

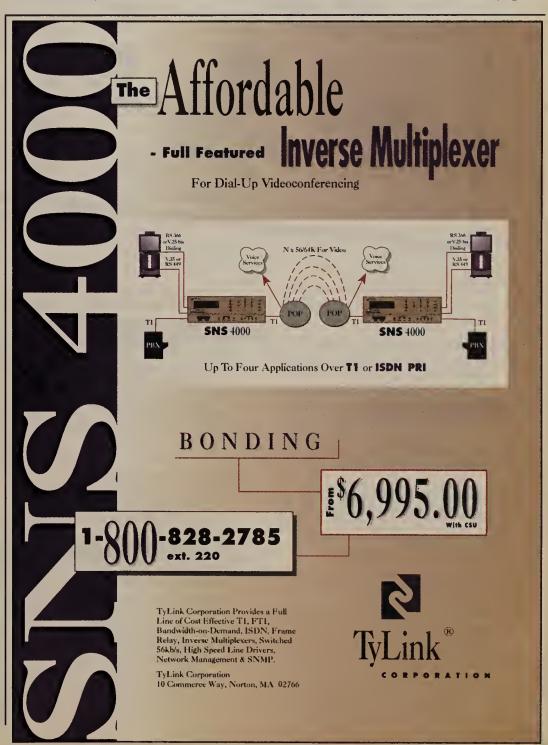
Key service and support Issues

Based on highest



The graphics on this page illustrate key findings of a recent Network World/ Focus Data, Inc. reader survey on T-1/T-3 multiplexers. Focus Data, an Independent market research firm in Framingham, Mass., conducted the survey and tabulated the results. The response base was 100. Focus Data can be reached at (508) 626-2556.

Don't know at this time



Continued from page 51.

important issue. Most vendors offer extensive lists of support options, from installation and configuration assistance to complete network outsourcing.

Vendors vary in their packaging of support, but most field an around-the-clock technical assistance center. Users should require vendors to clearly state the extent and possible added costs of enhanced or additional support, such as on-site and remote troubleshooting, overnight delivery of parts and net design.

It should be noted that, of all the vendors, only Coastcom and Telco Systems offer fiveyear warranties as standard. Most other vendors offer one- or two-year warranties. However, it only makes sense to have a five-year warranty on a piece of equipment you plan to keep for five years.

PRICING

As with many things in life, you generally get what you pay for when it comes to T-1/T-3 multiplexers. Units in the chart range from \$2,750 to \$100,000, and functionality and options vary just as widely.

However, vendors are releasing newer, more economical products, especially access multiplexers that link branch offices to corporate backbones, says Martin Dintzis, an analyst at Datapro Information Services Group in Delran, N.J. "Vendors have also added adaption options, such as local-area network boards and frame relay interfaces."

Vendors are also willing to price their products as part of an overall network design rather than on an individual basis. "Many of the vendors I talk with prefer to give pricing for a specific network configuration," Dintzis says. "They want to sell a complete system rather than individual multiplexers.

In general, muxes are deployed on a five-

year depreciation schedule. The problem for managers today is that it may often not be possible to judge net requirements that far off.

For this reason, it is important to look at the expandability and upgradeability of the device when purchasing a core backbone node.

Users may choose to buy single-minded devices, such as the multiplexing DSU/CSUs, and specialized T-3 multiplexers with the intention of using them for hybrid networks in the future.

As an example, the Digital Link Corp. DL 3100 Digital Service Multiplexer T-3 multiplexer lists for only \$10,995 and can be used for public and private services.

The question of how much to spend comes down to whether the company will be committed to maintaining at least a partially private network for five years.

Many corporations have already made a significant investment in private networking equipment and are not prepared to dismantle a

proven commodity. Still others expanding nets overseas, where private voice is becoming increasingly attractive due to lower cost private circuits and minimal discounts for switched voice.

26T-1/T-3 multiplexer products have some form of **SNMP support** -that's 26 more than last year.

With the lines between device classes blurring quickly, it is difficult to predict the future of the T-1/T-3 multiplexer. What is apparent is that current architectures will have to undergo vast changes to handle the wideband future.

Multiplexer vendors are busily repositioning themselves as ATM vendors, meaning they are making significant investments in new technology that will not directly affect these products. However, they are making efforts to smooth the migration.

The T-1/T-3 multiplexer is likely to undergo minor revisions and enhancements that will make it attractive for current users to expand

their networks further. Users can expect vendors to offer intelligence aimed at giving users the option to choose the appropriate public or private service for each application and connection.

T-1 muxes are the most cost-efficient way to access public networks. And they will continue to exist in the network for many years, says Rich Mavrogeanes, product-line manager with General DataComm, which markets multiplexers, routers and ATM products.

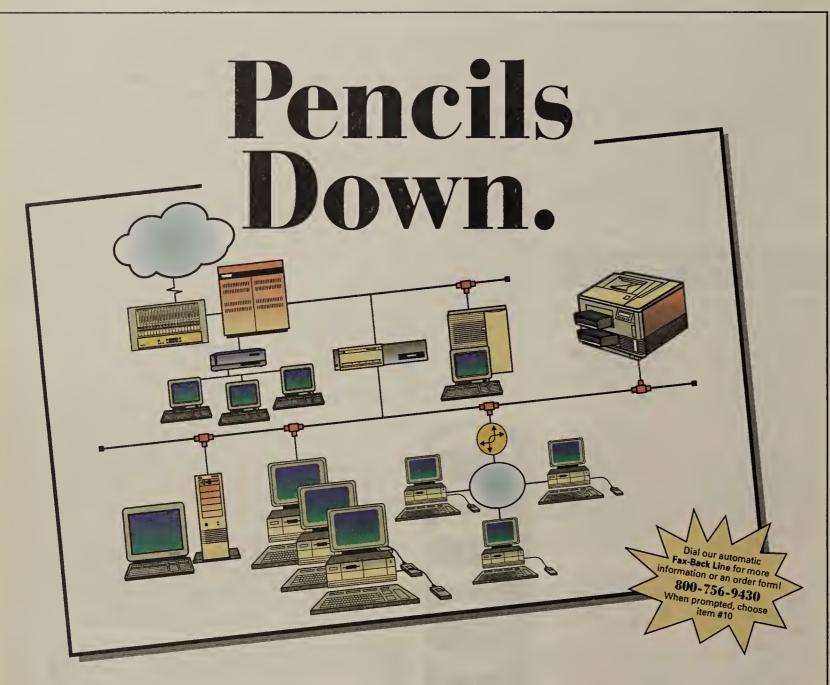
Also important will be connection of legacy systems to ATM backbones as users have to connect existing applications to high-speed backbones and public services.

In the short term, users can expect new T-3 and SONET interfaces as user demand for those services rises as they become more widely available.

For now, though, users are continuing to find the T-1/T-3 multiplexer to be a reliable building block for multiapplication networks, especially as these networks grow out to smaller and smaller branch offices and up into huge broadband transport.

As vendors evolve their offerings, users are keeping the T-1/T-3 multiplexer on their shopping lists. As Cray's Stephens says, "It works

→ Finn is a senior analyst with TeleChoice, Inc., a Verona, N.J., consultancy specializing in strategic planning and analysis of intelligent networks, services and applications. He can be reached at (201) 239-0700 or via MCI Mail at 445-4690.



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Help desk

Continued from page 2

David Segura, a senior systems consultant at Trellis Network Services, Inc., a systems integrator in Princeton, N.J., offers these tips for improving IPX communications over 56K bit/sec links:

If you are using NetWare 3.11, first consider using Novell, Inc.'s Packet Burst/Large Internet Packet (PBURST/LIP), which increases network throughput by as much as 300% to 400%. PBURST/LIP allows servers and workstations to negotiate the largest common packet size they can exchange, lowering the overhead-to-data ratio of communications frames. PBURST/LIP also enables routers to exchange and acknowledge multiple packets as a single packet, instead of one at a time. PBURST/LIP is already incorporated in Net Ware 4.X, and is available as a Net-Ware Loadable Module for earlier versions.

You could also install Novell's NetWare Service Advertising Protocol Restrictor, which will prevent needless traffic from crossing the line and taking up bandwidth.

If either local network is connected to a backbone or has more than a single segment, such as a multiple server site, consider placing routers on their own segment or backbone; general workstation traffic should not have to be filtered by the router.

You should also check to make sure all affected servers have enough random-access memory to maintain at least a 30% to 40% File Cache Buffer size. To check this information, type "Load monitor" at the server prompt, and then select Resource Utilization.

Another tip is to have users, including network administrators, attach to servers across the link, rather than logging in to remote servers, so executable files (such as login scripts) on the remote server do not have to cross the wire.

Letters

Continued from page 43

the U.S. Your cartoon, showing RSA being crossed out in favor of DSS, like the opinion piece, misses the mark very badly. Let's set the record straight.

Jim Bidzos President RSA Data Security, Inc. Redwood City, Calif.

The real issue

Contrary to Bruce Schneier's opinion, the National Institute of Standards and Technology's (NIST) Digital Signature Standard (DSS) patent was challenged and an opinion was rendered that the patents of German professor Claus Schnorr predated NIST's patent. Hence, NIST's patent is invalid.

Schnorr exclusively licensed his patents to Public Key Partners, Inc. (PKP). Hence, Schneier's attempt to surface a legal issue leaves the real story untold.

This matter shows that the U.S. government hasn't adapted to its new position in the standards world. When the metallurgical composition of stainless steel needed to be set to assure uniformity or standards, NIST served a vital role. The composition of stainless steel hasn't changed since it was originally set.

But in the world of advanced communications and computers, the standards are set by the market place.

The de facto standard for digital signatures in the marketplace is the Rivest-Shamir-Adelman algorithm (RSA), and it serves the market very well. NIST doesn't serve any useful func-

Net Dra

tion in the new world order.

The real issue here is the NIST/National Security Agency agenda of trying to decertify the Data Encryption Standard and challenge RSA's position in the market. This is not a role government should be allowed to pursue. It deserves the coverage and exposure you gave to

> Bill Ferguson Vice president, marketing and sales Semaphore Communications Corp. Santa Clara, Calif.

Schneier responds: While Schnorr did claim that the NIST patent infringed on his own, the matterwas never decided by the courts. The scope of any public-key cryptography patent (including those held by PKP) has never been decided by the

One of NIST's goals in developing a DSS, as stated by their own documents, was to have a standard unencumbered by patents. NIST should have challenged both the Schnorr and the PKP patents. They might have lost, but they might have won. In either case, they would have settled the issue of how broadly the existing public-key cryptography patents cover different technologies. By not doing so, they just added to the confusion.

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ant support of NetWare 4.X — including Net-

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Working closely with Novell as an OEM, we launched this product in August 1993. As one of the earliest adopters of the SMS format, we were able to use the appropriate SMS hooks in our NetWare Loadable Module to bring a product to market at the same time Novell started shipping 4.0.

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For the benefit of your readers who may be hesitant to move to NetWare 4.01 because of backup concerns, please let them know Rememory has a solution in production and that we can be reached at (800) 644-2300.

Susan Kennedy Director of marketing Rememory Costa Mesa, Calif.

Regarding your cover story "NetWare Users Backed Up on 4.x Deployment" (Oct. 25, page 1): Please let your readers know that an archive system does exist that provides full Storage Management Services (SMS)-compli-

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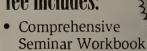
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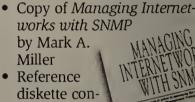
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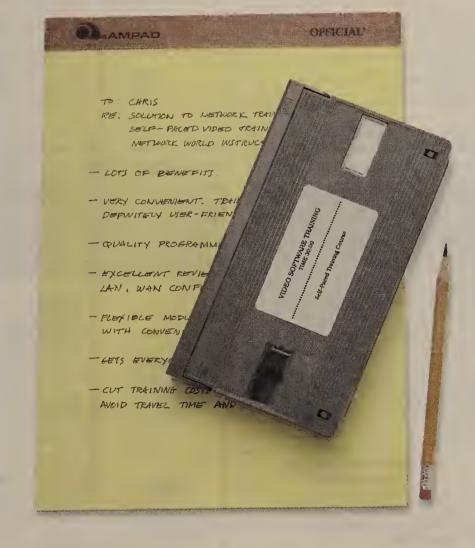
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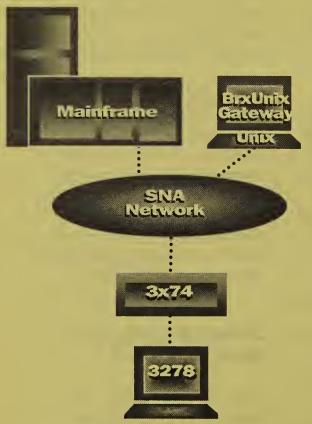
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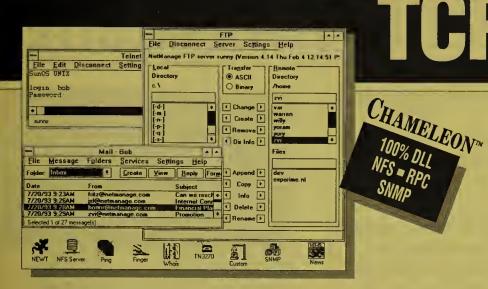






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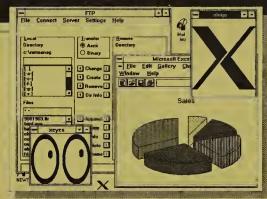
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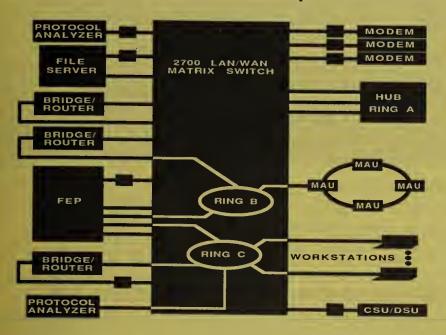


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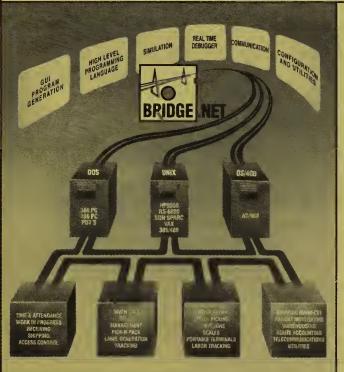
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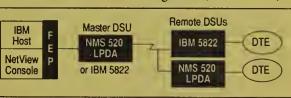
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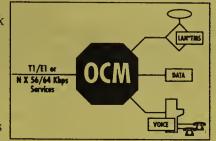


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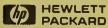
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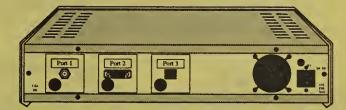


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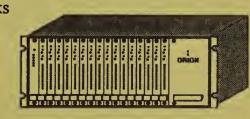
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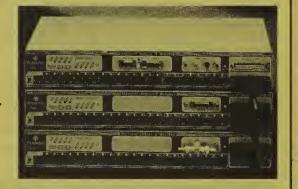
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By Paul Longorla

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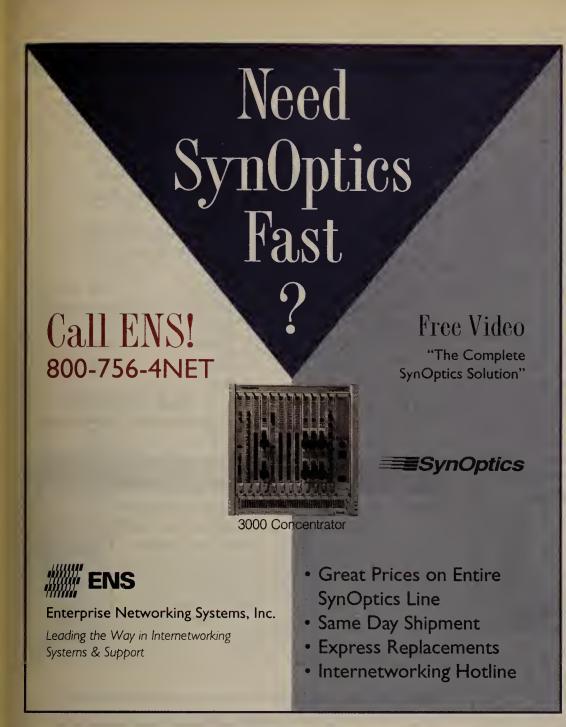
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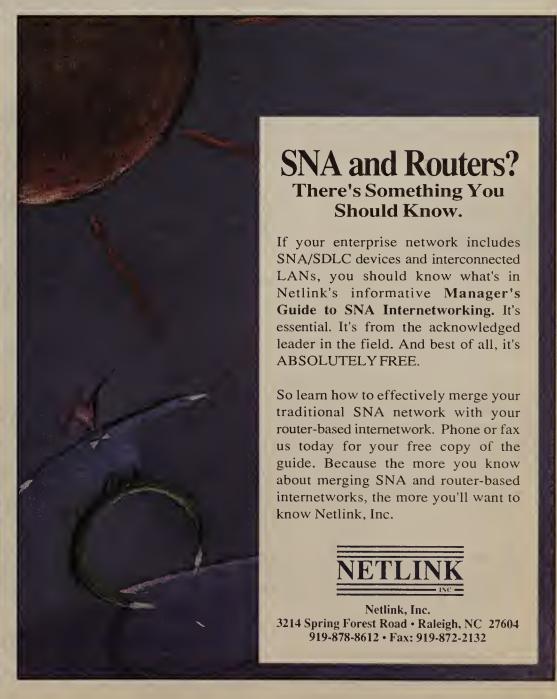
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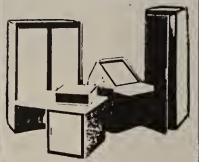
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Sun to deliver distributed SunNet Manager system

BY CHRISTINE BURNS

Mountain View, Calif.

SunConnect is planning a series of enhancements that will evolve its Sun-Net Manager into a fully distributed network management platform.

SunConnect is the Sun Microsystems, Inc. business unit that oversees development of SunNet Manager, a Simple Network Management Protocol-based network management platform. Sources say SunConnect will announce during the next six months SunNet Manager modifications that improve management console-to-management console communication and provide shared subnet management databases.

The company will also provide a common application program interface that will let SunNet manager collect data from all management applications running on a distributed net.

News of the upcoming changes came to light last week after McCaw Cellular Communications, Inc. made public its choice of Sun's SunNetworks group as the systems integrator that will deliver integrated network management capabilities for McCaw's muchtalked-about Cellular Digital Packet Data (CDPD) net.

Mark Freund, managing director of SunNetworks, said the technologies to

be included in the next generation of SunNet Manager will be used to help manage the CDPD network which McCaw plans to deploy in more than 105 markets around the country by mid-1994. McCaw's internal business net is being used as the breeding ground for the new SunNet Manager technologies.

Manager-to-manager communications will enable a customer to distribute systems management tasks throughout the company while maintaining direct communication with all subnet managers.

For example, a systems administrator could delegate the task of monitoring all routers to one administrator while delegating management control of a separate departmental subnetwork

Communication between management consoles goes hand in hand with the concept of shared management databases. Customers will be able to store data about any management change on databases shared by both the network administrator and all subnet managers.

It is unclear whether SunConnect will develop these technologies or whether partnerships will be formed to acquire them.

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OpenView

Continued from page 1

however, HP will release OpenView 3.3, which will include enhancements in event handling, status monitoring and data collection capabilities.

Central to OpenView's transition will be enhancements to three key areas: the user interface, data storage and data collection.

In the user interface arena, HP will enable network operators to view an OpenView graphical map from any Unix, Windows or Windows NT workstation. Management applications will be launchable from any of these workstations, whether the application resides locally or remotely, and management data can be shared by multiple OpenView operators.

Currently, OpenView operators can only launch applications resident on their own consoles and are usually dependent on a single Ingres database for data storage and retrieval.

Also, users can transfer management operations between work stations at different sites to facilitate offhour management of the net, or for backup in the event that Open View, consoles in one area are knocked off-line. For example, when a business day concludes in London, management of the London net can be transferred to New York until the next business day.

A distributed user interface will help users establish management domains whereby an enterprise network is managed as a collection of subnetworks, HP said. Specific management functions can then be delegated to specific domains by the net administrator.

For data storage, HP's plans hinge on defining a

Generic enabling applications

(common repository)

Data integration framework

HP's management repository plan

Relational DBMS

SOURCE: HEWLETT-PACKARD CO., PALO ALTO, CALIF, GRAPHIC BY SUSAN J, CHAMPENY

HP's common repository for OpenView will allow multiple types of networks and objects to feed management data to a common database, paving the way for powerful new mapping, report generation, event correlation and other

Common repository

way to integrate multiple databases condifferent taining information into a single logical repository (see story, this page). The repository is intended to let users store management data wherever they want but have that data accessible from any OpenView console in the net.

With a common repository, users can store different types

of information — such as event, topology or map — in different databases or group databases by domain, while maintaining uniform access from every Open-View console.

In the area of data collection, HP plans to develop software that can reside on any client or server in a distributed network and collect relevant data for any management application. These data collectors could combine collection requests from multiple applications, delegate data retrieval processing to various networked systems, and filter and summarize collected data before it's delivered to the OpenView console.

Data collectors could also perform event threshold and baseline security checking, and automatically compile data based on those examinations.

Data collectors can also take advantage of the SNMP Version 2 (SNMPv2) manager-to-manager MIB, which allows management consoles to exchange information. HP did not disclose when OpenView would support SNMPv2.

HP plans to make OpenView modular enough to scale from a single work group console to several regional site managers and then up to multiple enterprise managers governing heterogeneous environments. OpenView consoles at each level will be able to share management information and engage in cooperative, peer-to-peer management of the enterprise.

This capability lets users start with OpenView at the work group or enterprise level and then scale up or down as their nets grow, while maintaining consistency and ease of use throughout the management

Analysts said HP is positioning OpenView more as an integrator of business processes than as a manager of networks and systems. But they were disappointed that HP didn't provide more details about the common repository.

''I think their overall thrust makes a lot of sense,'' said John McConnell, president of McConnell Consulting in Boulder, Colo. "The common data repository garnered a lot of interest because there weren't many specifics about it. I don't know why they're being so cagey. NetLabs [Inc.] demonstrated some of their distributed common repository technology over a year ago. It's not like it's secret rocket science."

Common repository key to distributed **OpenView**

A key component of Hewlett-Packard Co.'s plan to make Open View a more distributed, scalable management system is the concept of a common data repository.

The repository will be a logical database comprising several distributed databases, each housing management data on various enterprise network elements or groups of elements. Through common interfaces and calls, any OpenView management application will be able to store and

access data in the repository (NW, July 26, page 1).

This is radically different from OpenView's current database structure, under which applications from HP use an Ingres database that stores information only on Internet Protocol devices. Third-party OpenView applications support different databases with different sets of calls and interfaces for accessing them.

That means OpenView applications cannot easily share management data.

And those databases might house multiple references to the same managed device, thus reducing data integrity.

HP's common data repository will house inventory, topology, trend, event and historical attribute information on TCP/IP, SNA, NetWare and other network environments, and on users, systems and software on the enterprise net. In addition to Ingres, it will support Sybase, Inc. and Oracle Corp. databases in its first release expected early next year - but over time, it's intended to support any database a user chooses.

To prepare for the common data repository, HP's encouraging users and developers to design management applications based on today's relational database technology but with an eve toward object-oriented techniques of the future.

Users agree on the importance of the common data repository. "It's probably the biggest issue I see right now," said Frederick Taverni, network manager at the U.S. Army's Picatinny Arsenal in Dover, N.J. "It's key to getting our application to work with each other."

Tom Fader, senior specialist at E.I. du Pont de Nemours & Co. in Wilmington, Del., was a little more skeptical. "I have grave doubts about the distributed database," he said. "I don't think they've thought it out."

BY JIM DUFFY

First things first

Prior to delivering the 4.0 vision, Hewlett-Packard Co. will offer OpenView 3.3, which will debut in December and will allow users to filter events based on severity and access more detailed descriptions of events. Filtering allows users to view Information only on certain events instead of scrolling through an entire event log. Version 3.3 will also allow users to receive events only from the devices on their network map or submap.

Also, 3.3 includes a Simple **Network Management Proto**col Action Daemon that automatically responds to net events even if OpenView is not running. For status monitoring, 3.3 Includes at least four new color-coded status indicators. Users can now determine If a device is unusable due to test-Ing, restriction or if it has been taken out of service.

Data collection enhancements in Version 3.3 Include performance enhancements to SNMP TRAP gathering. Verslon 3.3 agents can process and forward Information on 85 events per second. OpenVlew

3.3 can also now receive a burst of 28 TRAPs per second without dropping any.

Also, Version 3.3's SNMP data collector now requests collections asynchronously, which means as many as five data collection requests can be issued before a response is necessary. Previously, Open-View used a synchronous data collection method, which could only send additional requests after responses were received.

Version 3.3 will also include an enhanced Network Node Manager application. Network **Node Manager automatically** discovers and maps Information Protocol nodes, and receives alerts from those devices.

Enhancements Include automated discovery of IP nodes across a wide-area network, better performance and automated filtering, configuration and customization of events and alarms.

HP did not disclose pricing for OpenView 4.0 or 3.3.

HP: (415) 857-4111.

BY JIM DUFFY

E-mail

Continued from page 1

cialist at Unisys Government Systems Group's Communication Systems Division in Salt Lake City.

Orme said users get none of the advantages of Global MHS when it is used in conjunction with MHS 1.5, which he uses companywide.

"Unless I can get each site to implement [Global MHS], then there's no point putting it anywhere," Orme said. "And, the present release [of Global MHS] doesn't talk to NetWare 4.0's [NetWare Directory Service]"

That means if user information is changed on the corporate network, for example, it is not automatically reflected in the Global MHS directory.

"The fact that Global MHS doesn't talk to NDS is the single biggest reason we haven't distributed Global MHS to our branch offices," agreed J.R. Moase, senior network engineer at ComputerLand Corp., based in Pleasanton, Calif. "We are going to 4.0, but we're not going to Global because it doesn't work with 4.0."

Bryan Belmont, computer information systems manager at Security Capital Group, Inc. in Santa Fe, N.M., said his company has upgraded from MHS 1.5 to Global MHS. But, because Global MHS uses a different message format from MHS 1.5, many third-party gateway products currently in place no longer work.

"Global [MHS] took away the limitations [of MHS 1.5], but now we need all new gateways," he said.

S.O.S.

According to Novell, help is on the way.

The next major release of NetWare will ship with Global MHS built in, meaning NDS will be used as the directory for Global MHS, according to Phil Schacter, product line manager for message interoperability products at Novell.

"Our intent is to integrate MHS into the NetWare 4.X environment where NDS will be both a network resource and a message directory," he said. "MHS will become a core service within 4.X."

According to sources, that release is NetWare 4.1, expected this spring (NW, Oct. 18, page 1).

Schacter said the company has no additional plans for helping users migrate to Global MHS, but he pointed to an announcement at last week's E-Mail World by Amadeus Systems Corp. as a step toward getting users the third-party support necessary to implement Global MHS companywide.

Amadeus announced MBLink for Global MHS, which consists of two gateways — one for connecting Global MHS with Lotus Development Corp.'s cc:Mail and another for Microsoft Corp.'s MS Mail. Both are software-only products that let users of each environment exchange E-mail and provide directory synchronization between the systems.

The MBLink gateways will be available by the end of this month at \$995 each for a single-host version supporting as many as eight connected post offices, or \$3,995 each for a single-host version supporting an unlimited numbers of parts of fixed.

unlimited number of post offices.

According to Jay Jaiswal, president and chief executive officer of Amadeus, based in Vienna, Va., the company also plans to add connectivity between Global MHS and Digital Equipment Corp.'s All-in-One, MailWorks and VMS Mail E-mail environments.

And sources indicate that, by the first quarter of next year, Lotus will release its own Global MHS-to-cc: Mail gateway that will offer the same connectivity and directory synchronization as the Amadeus version.

"I wouldn't be negative about Global MHS; it's a new concept product, and it will take time for it to evolve," said Steve Glagow, director of electronic message service at BIS Strategic Decisions, a research and consulting firm in Norwell, Mass. "The potential is there." [2]

Contract

Continued from page 1

Levine, an attorney with the Washington, D.C. law firm Levine, Lapaga & Bloch. "But contract tariffs can be good because they provide sizable discounts to companies that couldn't have gotten them any other way."

Howard McNally, marketing vice president for AT&T's opportunity management center, said the carrier has filed 650 contract tariffs, with some users having more than one contract tariff. Unlike Tariff 12 network arrangements — which typically comprised a wide variety of services — slightly more than half of the contract tariffs filed only cover one network service, according to McNally.

"Users that just want lower [than tariffed] rates and larger discounts go for contract tariffs," McNally said. "For users that want the value-added like network management and consolidated billing, [Tariff 12] is the choice."

McNally stressed AT&T is still offering Tariff 12 deals. "Contract tariffs offer very attractive pricing for a fixed term and some measure of price stability," said George David, publisher for the Center for Communications Management Information in Rockville, Md., a provider of rate and tariff data. "That's what most companies want."

Case in point: America West Airlines, which was looking for big discounts, not extra benefits such as network management and customized billing.

America West was one year into a three-year contract for 800 service with AT&T when it was approached by MCI Communications Corp., which wanted the airline's toll-free business — a combined 80 million minutes a month at its four reservation centers. AT&T got

wind of the move and offered to renegotiate its existing 800 deal with the airlines.

Thomas Smith, America West's vice president of information systems, compared AT&T's new rates to those in existing Tariff 12 deals.

"We thought about asking for Tariff 12, but after the comparison, we didn't see where a Tariff 12 would be better," Smith said. "AT&T also offered big cash incentives and other incentives," he added, although he would not divulge them.

Smith said he tried to persuade AT&T to freeze rates for the length of the three-year contract tariff, but the carrier declined. "We did what we could, but this really wasn't a major concern. We are very pleased with the contract," he said.

Automatic Data Processing (ADP) of Roseland, N.J., put its business out to bid earlier this year and received attractive proposals from the Big Three — including a contract tariff deal from AT&T. Joe Gallo, vice president of corporate telecommunications, said ADP decided against asking for a Tariff 12. "We had gone through the pain and consternation of analyzing and reviewing a Tariff 12 deal back in 1988," he said. "We didn't want that again."

Gallo said he decided to go with the contract tariff AT&T pitched because it offered larger discounts that would save his firm millions of dollars. ADP received fixed rates for the length of the deal, and Gallo also negotiated capabilities such as flexible billing (see story, this page)

"The contract tariff was flexible," Gallo said. "We were pleasantly surprised how simple, brief and straightforward it was in comparison to [Tariff 12] arrangements."

Jim Longwell, data processing director for Best Western International, is pleased with the company's contract tariff overall but would be happier if AT&T would freeze its rates for the duration of

his contract, which covers 0+ pay phone, Software-Defined Network and 800 services.

"One thing that really bothers me is that we've been on SDN for five years, and there must have been 15 price hikes during that period," Longwell said, adding that AT&T would not agree to offer him fixed rates for 0+ service as part of his new contract tariff. "We really need the set rates to give our franchisees a service that is cost competitive with what other carriers offer."

Negotiating a good deal

Contract tariffs can offer customers a number of benefits, but experts say you only get what you're able to negotiate.

Negotiations for contracts are wide open and cover such items as liability, performance standards, account team support and penalties covering minimum volumes and early termination, said Gerard Cunningham, a tariff analyst with the consulting firm of Deloitte & Touche in Washington, D.C. He offered some bargaining tips based on his firm's experience in assembling a database of contract deals and negotiating 35 custom network agreements.

One key item open to negotiation is rate indexing v. rate stabilization. Under indexing, the price of a service covered under a contract deal is discounted — or indexed — from the standard tariff rate. As the tariff rate changes, so does the indexed rate.

That is in contrast to rate stabilization, under which prices are fixed throughout the term of a custom network deal. Today, AT&T is pushing hard for indexation in custom net deals.

Items to be discussed during contract talks include which services will be indexed, how they'll be indexed and whether there will be a ceiling on the index — "sort of like a variable-rate mortgage," Cunningham said. Other indexing negotiations cover a maximum increase or decrease over the life of the agreement and a maximum annual change.

"You may be better off setting a maximum change per year and a

maximum change over the life" of the contract, Cunningham said.

He added that users would be wise to downward index 800 service in anticipation of further postportability rate drops. Under downward indexing, if a tariff rate drops, the contract rate follows suit. Also, Cunningham recommends doing the same for international services, where he also expects rate cuts.

If a user's network traffic approaches \$1 million annually, it should consider Tariff 12 as an option, Cunningham said. In general, the more a user spends, the less attractive contract tariffs appear. On one \$4 million contract, he found Tariff 12 to be 15% less expensive than a contract tariff.

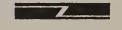
Below \$1 million, contract tariffs are the customer's only option. AT&T said it likes contract tariffs because they mean lower administrative costs.

For the user, signing a contract tariff could mean a better rate, but that doesn't always happen. "I'm not sure the buyers of that service completely understand what they're buying," Cunningham said. "A lot of them have been led to believe contract tariffs are better from a pricing point of view than Tariff 12 or they're less cumbersome, less restricting, etc., and that isn't necessarily true.

"You have to understand what your objectives are, not only cost reduction but agreement structure, and know what's out there in the marketplace and know how to get what you want," Cunningham said.

BY BILL BURCH

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